ICF-6700W

Canadian Model
US Model
AEP Model
UK Model
E Model

FM/AM MULTI BAND RECEIVER

SPECIFICATIONS

Power Requirements: 110, 120, 220 or 240V ac adjustable, 50/60Hz
9V dc, six batteries size D
(IEC designation R20)
12V car battery with optional
Sony Car Battery Cord DCC-130

Power Consumption: 7W ac

Dimensions: Approx. 453(w)x184(h)x227(d)mm
$17\frac{7}{8}$ (w) x $7\frac{1}{4}$ (h) x 9(d) inches
including projecting parts and controls

Weight: Approx. 5.5kg, 12 lb 2 oz including batteries

Circuit system: FM/MW: Superheterodyne
SW: Dual conversion superheterodyne

Frequency range: FM: 87.5–108 MHz
SW$_1$: 1.6–10 MHz (187.5–30 m)
SW$_2$: 11.5–20 MHz (26.1–15 m)
SW$_3$: 20–29.5 MHz (15–10.2 m)
MW: 530–1,605 kHz (566–187 m)

Antennas: FM: Telescopic antenna
SW: Telescopic antenna, External antenna terminals (50–75 Ω)
MW: Built-in ferrite rod antenna
External antenna terminals (low impedance)

Speaker: Approx. 10 cm (4 inches) dia.

Power output: 900 mW (at 10% harmonic distortion) at dc operation

Input: Timer input jack (minijack)

Outputs: Recording output jack (minijack)
output level 0.8 mV (−60 dB)
output impedance 1 kΩ
Earphone jack (minijack)
for 8Ω earphone
Multiplex output jack (minijack)
Headphones jack (stereo binaural type jack)
for 8Ω impedance stereo or monaural headphones

SAFETY-RELATED COMPONENT WARNING!!

COMPONENTS IDENTIFIED BY SHADING AND MARK ⚠ ON THE SCHEMATIC DIAGRAMS, EXPLODED VIEWS AND IN THE PARTS LIST ARE CRITICAL TO SAFE OPERATION. REPLACE THESE COMPONENTS WITH SONY PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL OR IN SUPPLEMENTS PUBLISHED BY SONY.

ATTENTION AU COMPOSANT AYANT RAPPORT
À LA SÉCURITÉ !

LES COMPOSANTS IDENTIFIÉS PAR UN TRAMÉ ET UNE MARQUE ⚠ SUR LES DIAGRAMMES SCHÉMATIQUES, LES VUES EXPLOSÉES ET LA LISTE DES PIÈCES SONT CRITIQUES POUR LA SÉCURITÉ DE FONCTIONNEMENT. NE REMPLACER CES COMPOSANTS QUE PAR DES PIÈCES SONY DONT LES NUMÉROS SONT DONNÉS DANS CE MANUEL OU DES SUPPLÉMENTS PUBLIÉS PAR SONY.

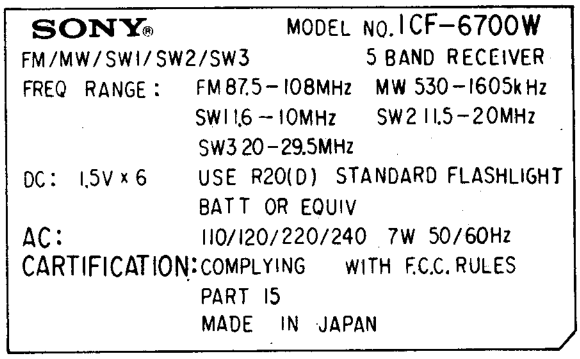
SONY®

SERVICE MANUAL

MODEL IDENTIFICATION

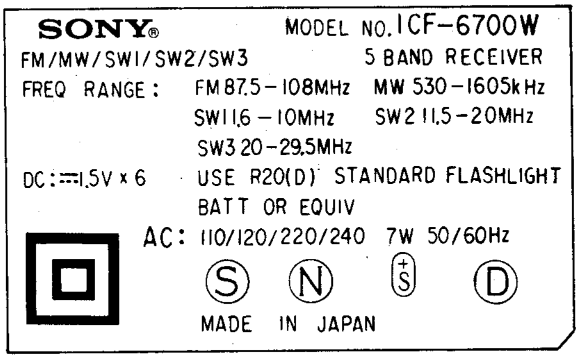
— Specification Label —

US, Canadian model



SONY® MODEL NO. ICF-6700W
FM/MW/SW1/SW2/SW3 5 BAND RECEIVER
FREQ RANGE: FM 87.5–108MHz MW 530–1605kHz
SW1 1.6–10MHz SW2 11.5–20MHz
SW3 20–29.5MHz
DC: 1.5V × 6 USE R20(D) STANDARD FLASHLIGHT
BATT OR EQUIV
AC: 110/120/220/240 7W 50/60Hz
CARTIFICATION: COMPLYING WITH F.C.C. RULES
PART 15
MADE IN JAPAN

AEP, UK model



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FREQ RANGE: FM 87.5–108MHz MW 530–1605kHz
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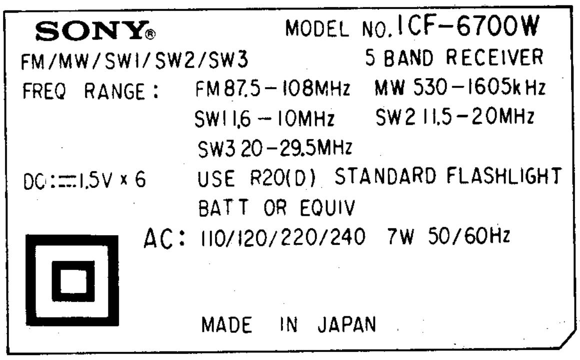
BATT OR EQUIV
⧈ AC: 110/120/220/240 7W 50/60Hz
Ⓢ Ⓝ +Ⓢ Ⓓ
MADE IN JAPAN

E model



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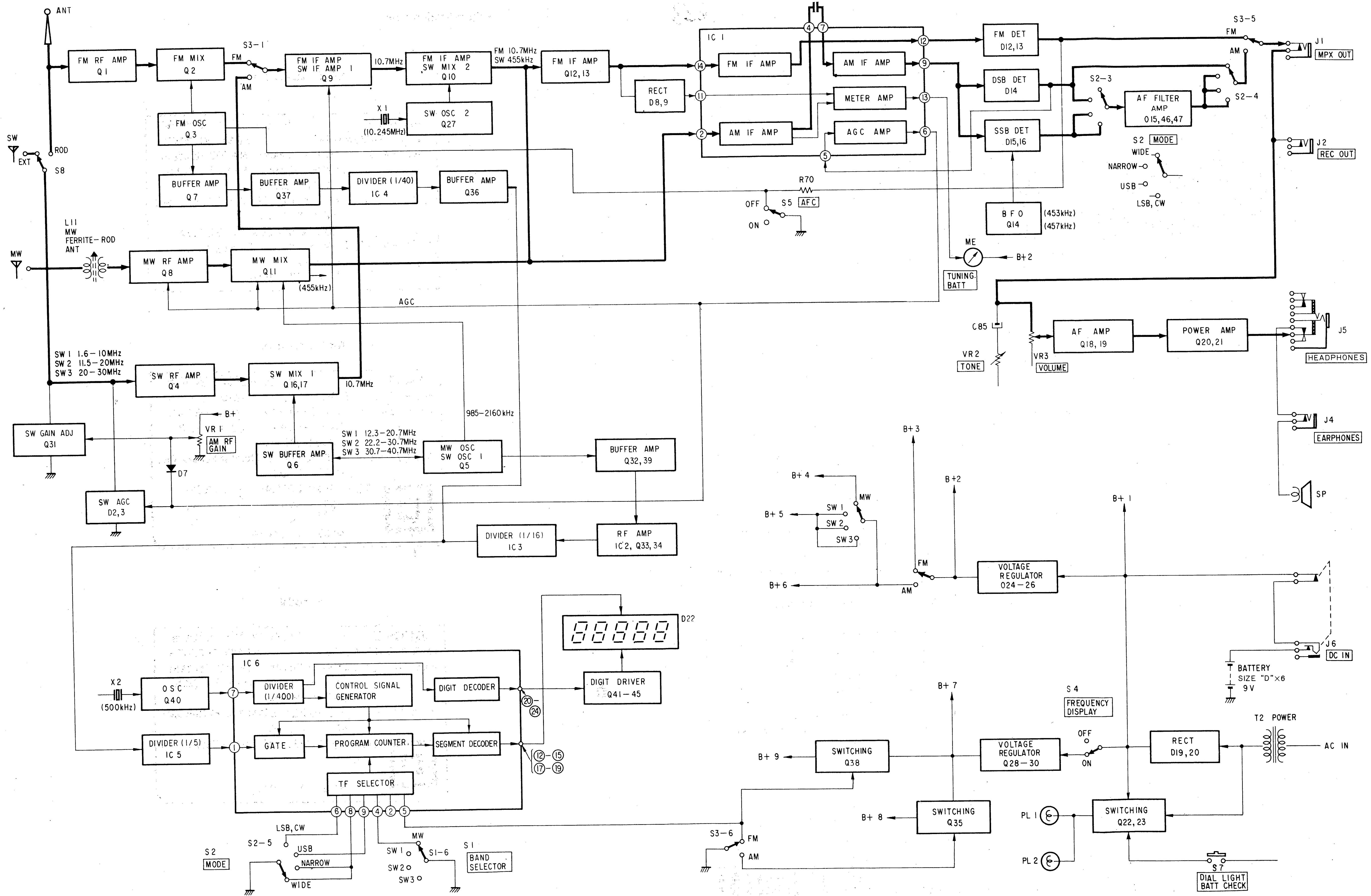
BATT OR EQUIV
⧈ AC: 110/120/220/240 7W 50/60Hz
MADE IN JAPAN

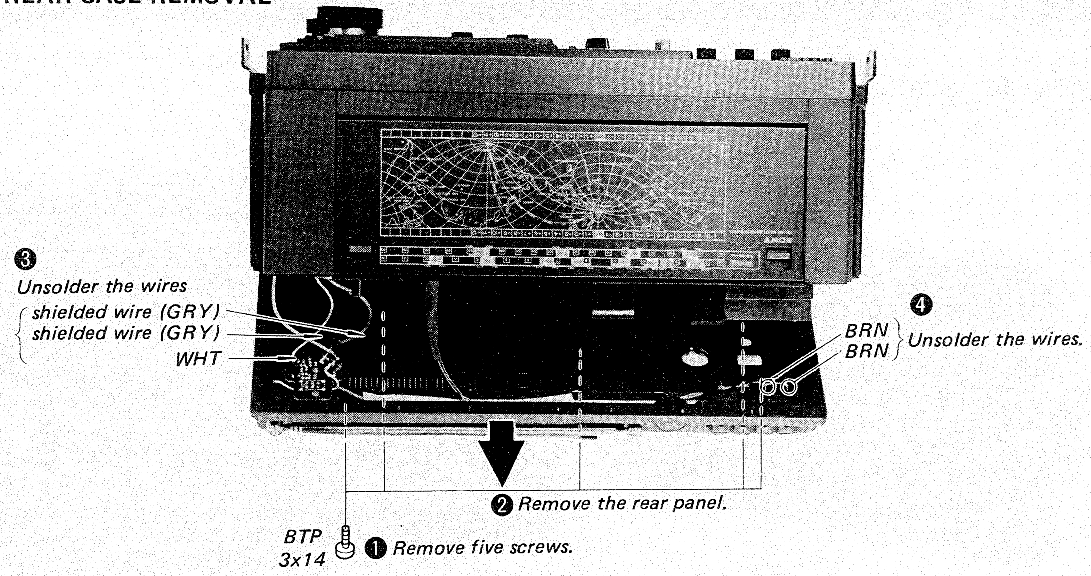
1-1. BLOCK DIAGRAM


ANT
FM RF AMP
Q1
FM MIX
Q2
S3-1
FM
AM
FM IF AMP
SW IF AMP 1
Q9
10.7MHz
FM IF AMP
SW MIX 2
Q10
FM 10.7MHz
SW 455kHz
FM IF AMP
Q12,13
X1
(10.245MHz)
SW OSC 2
Q27
FM OSC
Q3
SW
EXT
ROD
S8
BUFFER AMP
Q7
BUFFER AMP
Q37
DIVIDER (1/40)
IC 4
BUFFER AMP
Q36
C60
IC 1
FM IF AMP
AM IF AMP
METER AMP
AM IF AMP
AGC AMP
RECT
D8,9
R70
OFF
ON
S5
AFC
FM DET
D12,13
DSB DET
D14
SSB DET
D15,16
BFO
Q14
(453kHz)
(457kHz)
S3-5
FM
AM
J1
MPX OUT
S2-3
AF FILTER
AMP
Q15,46,47
S2-4
J2
REC OUT
S2
MODE
WIDE
NARROW
USB
LSB, CW
ME
B+2
TUNING,
BATT
L11
MW
FERRITE-ROD
ANT
MW
MW RF AMP
Q8
MW MIX
Q11
(455kHz)
AGC
C85
VR2
TONE
VR3
VOLUME
AF AMP
Q18,19
POWER AMP
Q20,21
J5
HEADPHONES
J4
EARPHONES
SP
SW1 1.6-10MHz
SW2 11.5-20MHz
SW3 20-30MHz
SW RF AMP
Q4
SW MIX 1
Q16,17
10.7MHz
985-2160kHz
B+
VR1
AM RF
GAIN
SW GAIN ADJ
Q31
D7
SW AGC
D2,3
SW BUFFER AMP
Q6
SW1 12.3-20.7MHz
SW2 22.2-30.7MHz
SW3 30.7-40.7MHz
MW OSC
SW OSC 1
Q5
BUFFER AMP
Q32,39
RF AMP
IC2, Q33,34
DIVIDER (1/16)
IC3
B+3
B+4
MW
SW1
SW2
SW3
B+5
B+2
B+1
FM
AM
B+6
VOLTAGE
REGULATOR
Q24-26
J6
DC IN
BATTERY
SIZE "D"×6
9V
D22
DIGIT DRIVER
Q41-45
X2
(500kHz)
OSC
Q40
IC 6
DIVIDER
(1/400)
CONTROL SIGNAL
GENERATOR
DIGIT DECODER
20-24
DIVIDER (1/5)
IC 5
GATE
PROGRAM COUNTER
SEGMENT DECODER
12-15
17-19
TF SELECTOR
LSB, CW
S2-5
USB
NARROW
WIDE
S2
MODE
MW
SW1
SW2
SW3
S1-6
S1
BAND
SELECTOR
S3-6
FM
AM
B+7
S4
FREQUENCY
DISPLAY
T2 POWER
AC IN
B+9
SWITCHING
Q38
VOLTAGE
REGULATOR
Q28-30
OFF
ON
RECT
D19,20
B+8
SWITCHING
Q35
PL1
PL2
SWITCHING
Q22,23
S7
DIAL LIGHT
BATT CHECK

2-1. REMOVAL

- Follow the disassembly procedure in the numerical order given.

REAR CASE REMOVAL



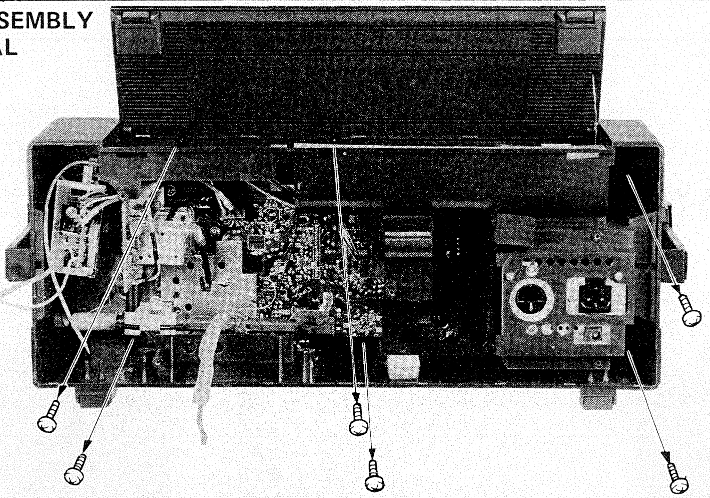
❸ Unsolder the wires
shielded wire (GRY)
shielded wire (GRY)
WHT

❹ Unsolder the wires.
BRN
BRN

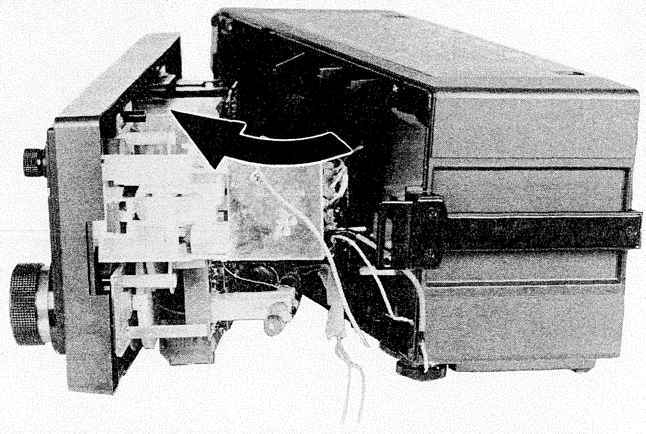
❷ Remove the rear panel.

BTP 3x14 ❶ Remove five screws.

CASE ASSEMBLY REMOVAL

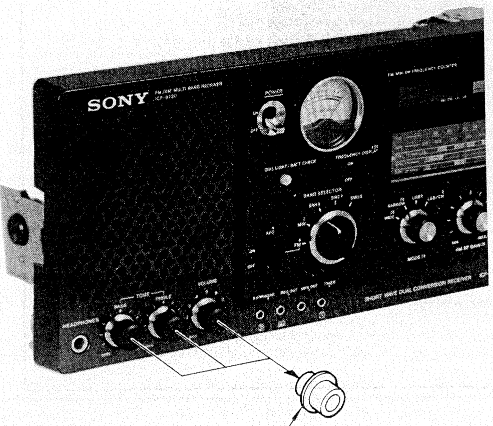


❶ Remove six screws. BTP 3x14 (black)

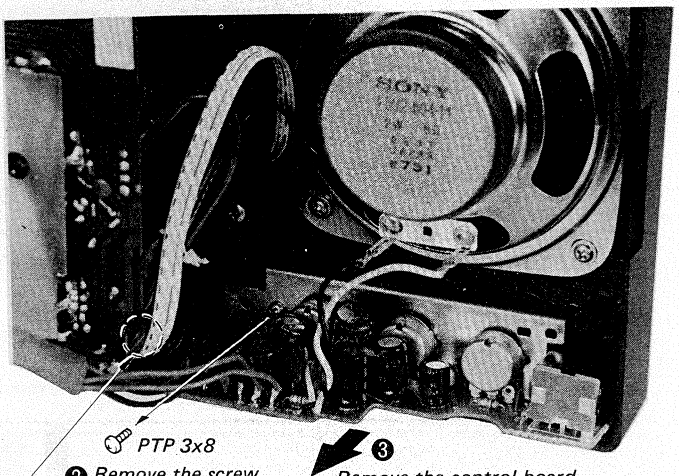


❷ Remove the case as shown by the arrow.

CONTROL BOARD REMOVAL



❶ Remove the knobs.

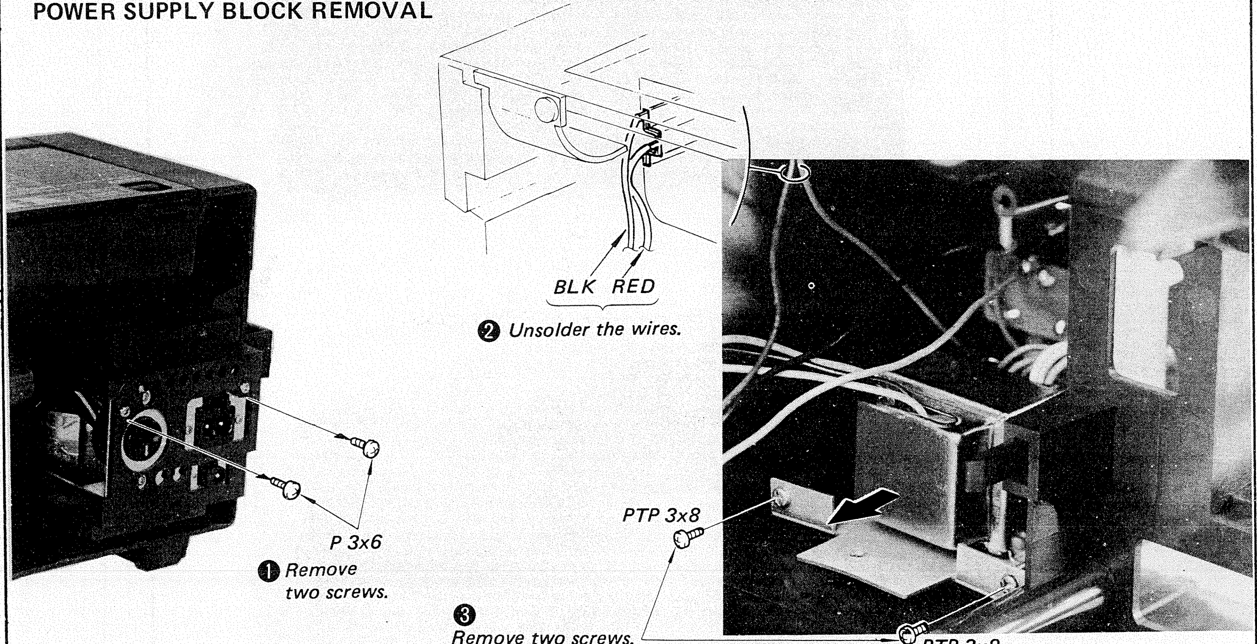


❷ Remove the screw.

❸ Remove the control board.

Be careful not to hitch the capacitor.

POWER SUPPLY BLOCK REMOVAL


BLK
RED
P 3x6
PTP 3x8
PTP 3x8

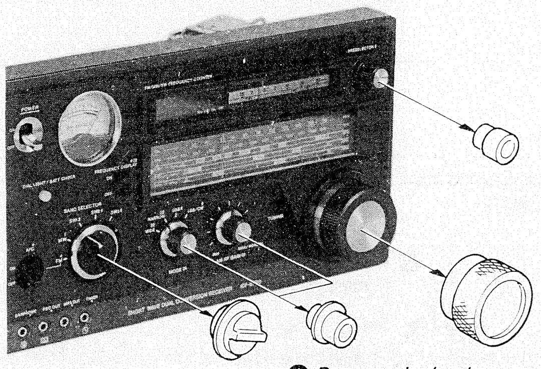
❶ Remove two screws.

❷ Unsolder the wires.

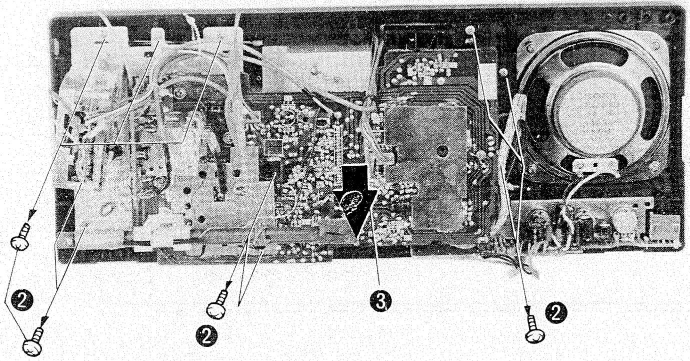
❸ Remove two screws.

❹ Remove the power supply block in the direction shown by the arrow.

FRONT PANEL REMOVAL



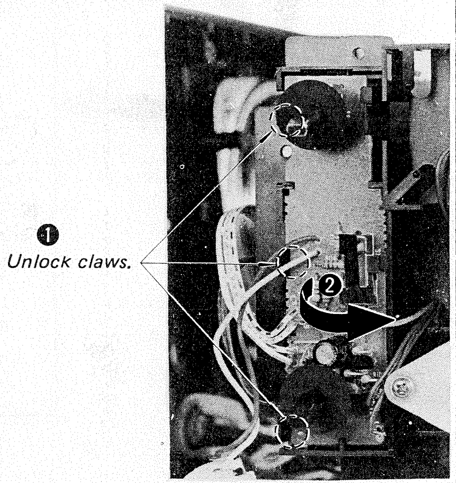
❶ *Remove the knobs.*



❷ *Remove ten screws (BTB 3 x 10)*

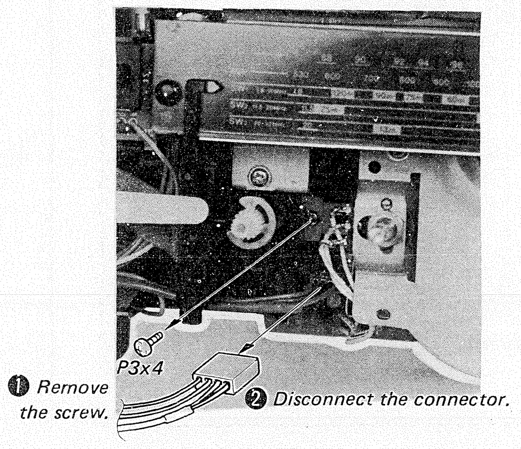
❸ *Remove the chassis in the direction shown by the arrow.*

LAMP BOARD REMOVAL



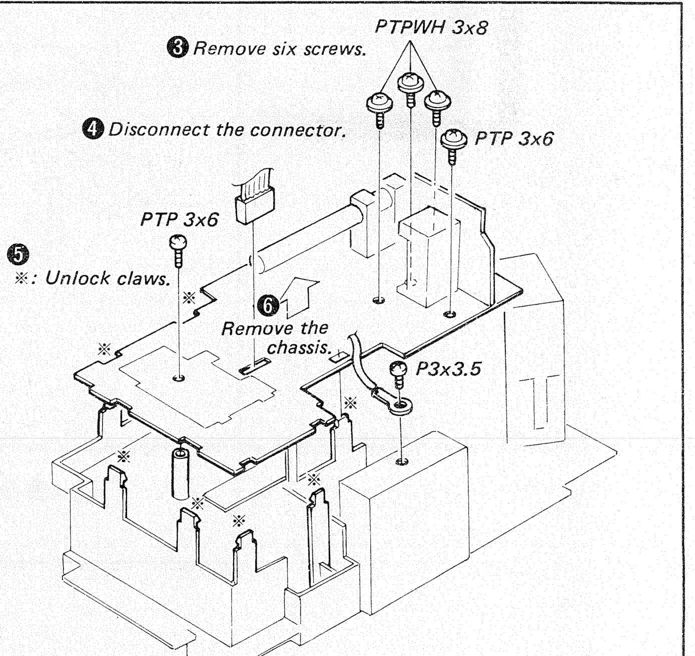
❶ *Unlock claws.*

MAIN BOARD REMOVAL



❶ *Remove the screw.*

❷ *Disconnect the connector.*


PTPWH 3x8
PTP 3x6
PTP 3x6
P3x3.5
※

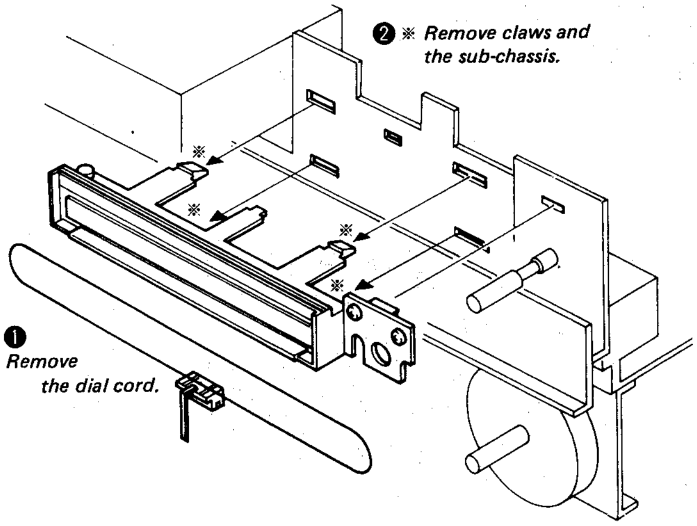
❸ *Remove six screws.*

❹ *Disconnect the connector.*

❺ *※: Unlock claws.*

❻ *Remove the chassis.*

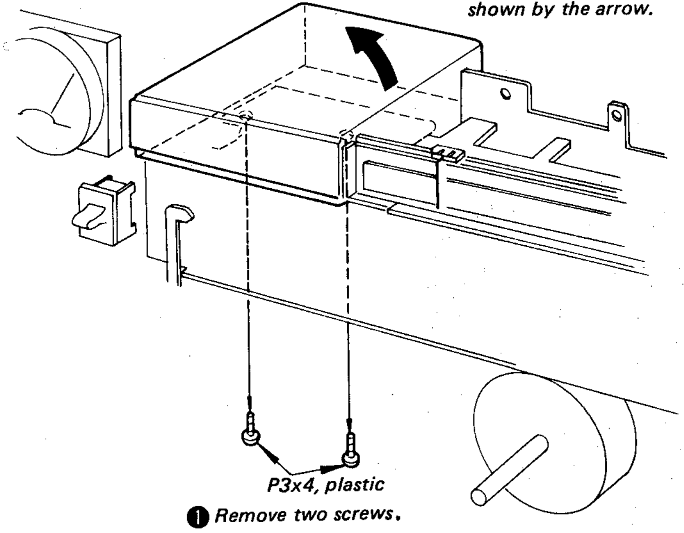
SUB-CHASSIS REMOVAL



❷ ※ *Remove claws and the sub-chassis.*

❶ *Remove the dial cord.*

COUNTER BLOCK REMOVAL

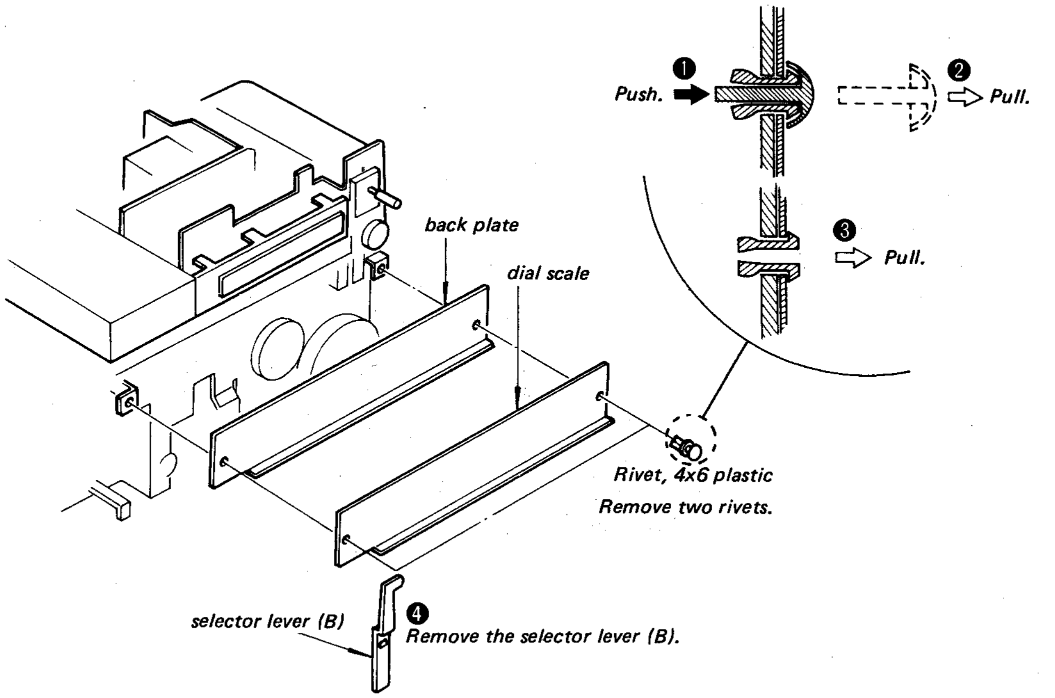


❷ *Take out the counter in the direction shown by the arrow.*

P3x4, plastic

❶ *Remove two screws.*

DIAL SCALE REMOVAL


Rivet Removal
Push.
Pull.
Pull.
back plate
dial scale
Rivet, 4x6 plastic
selector lever (B)

❶ Push.

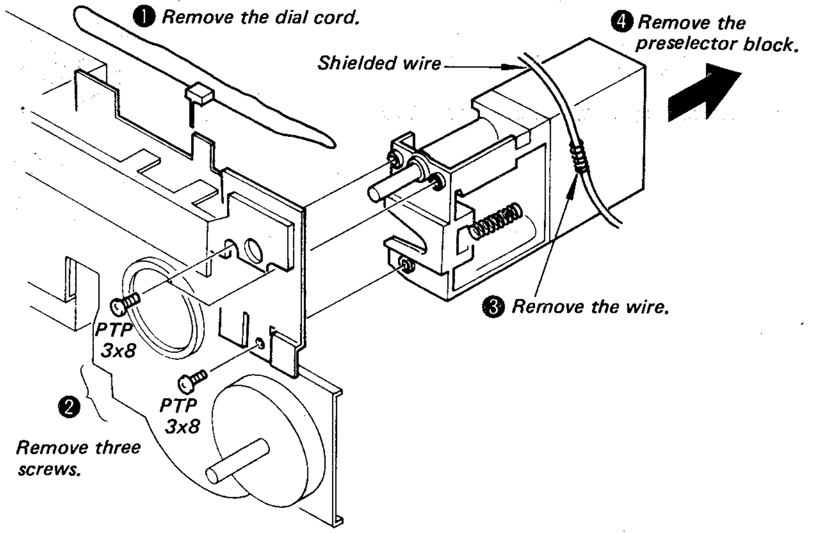
❷ Pull.

❸ Pull.

Remove two rivets.

❹ Remove the selector lever (B).

PRESELECTOR BLOCK REMOVAL

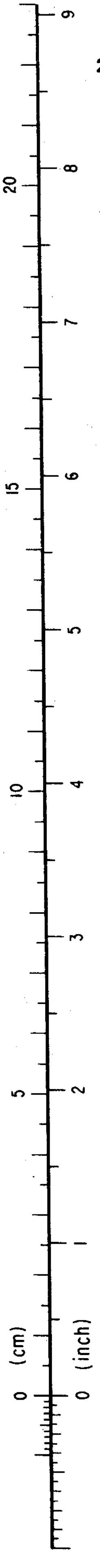

Shielded wire
PTP 3x8
PTP 3x8

❶ Remove the dial cord.

❷ Remove three screws.

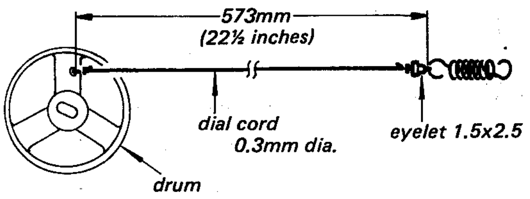
❸ Remove the wire.

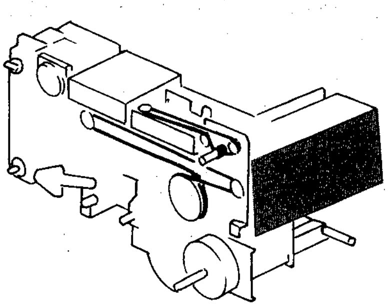
❹ Remove the preselector block.


9
8
20
7
6
15
5
4
10
3
2
5
1
(cm)
(inch)
0
0

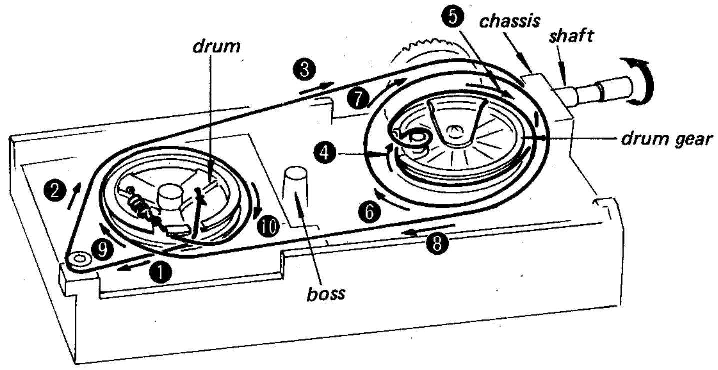
2-2. CORD STRINGING OF PRESELECTOR DRUM

1. Cord Preparation


573mm
(22½ inches)
dial cord
0.3mm dia.
eyelet 1.5x2.5
drum

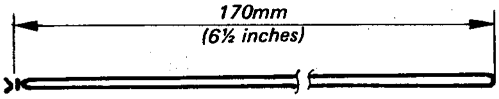


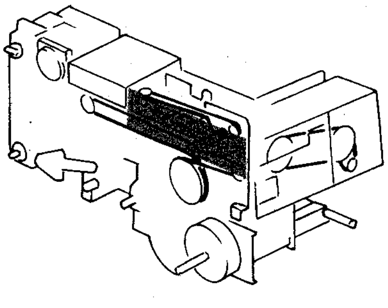
2. Dial Cord Stringing
   Proceed in the numerical order given, after turning the shaft and the drum fully clockwise.


❺
chassis
shaft
drum
❸
❼
drum gear
❹
❷
❻
❿
❾
❽
❶
boss

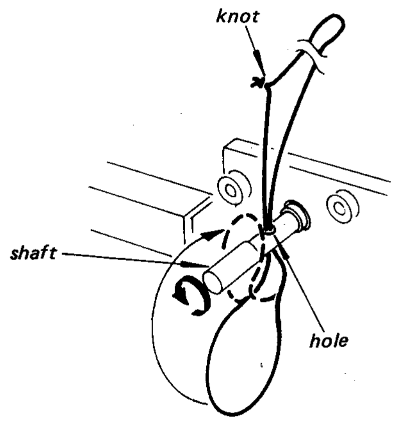
2-3. DIAL CORD STRINGING OF PRESELECTOR

1. Dial Cord Preparation

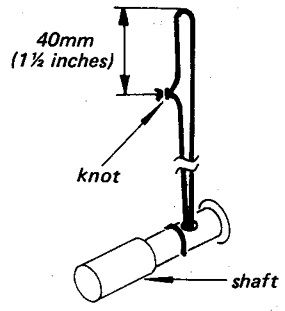

170mm
(6½ inches)



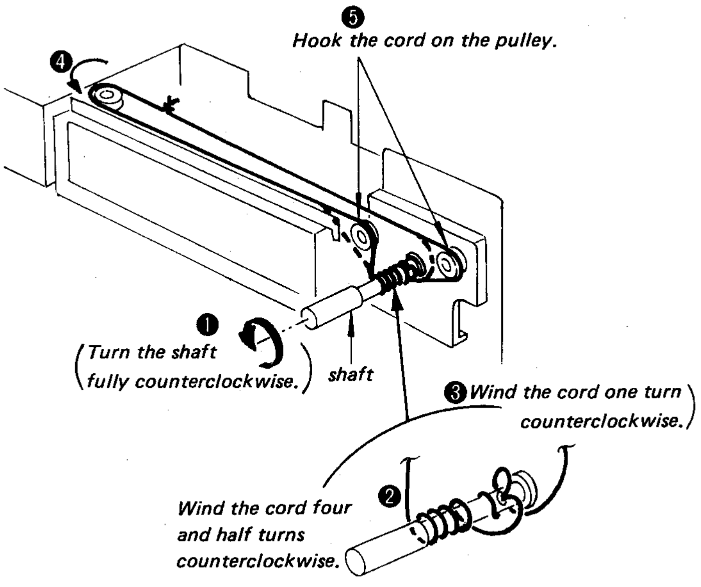
2. Turn the shaft fully counterclockwise and thread the dial cord in the hole of the shaft as shown below.


knot
shaft
hole

3. Set the knot of the dial cord as shown below.


40mm
(1½ inches)
knot
shaft

4. Proceed in the numerical order given.



❺ Hook the cord on the pulley.

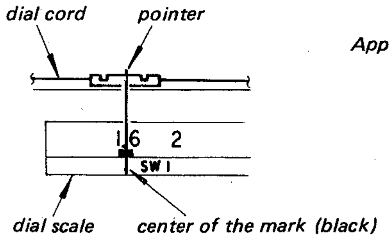
❹

❶ (Turn the shaft fully counterclockwise.)

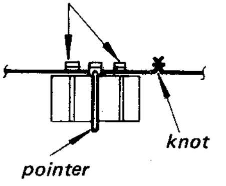
❸ Wind the cord one turn counterclockwise.

❷ Wind the cord four and half turns counterclockwise.

5. Install the pointer at the position as shown below, after turning the shaft fully clockwise.

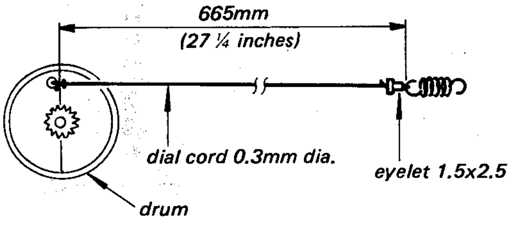

dial cord
pointer
1.6
2
SW1
dial scale
center of the mark (black)

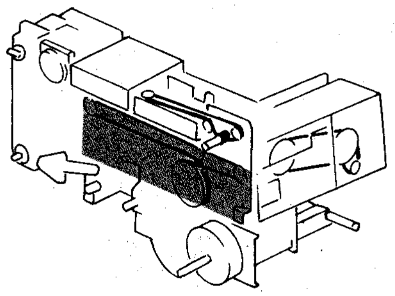
Apply the suitable locking compound.


knot
pointer

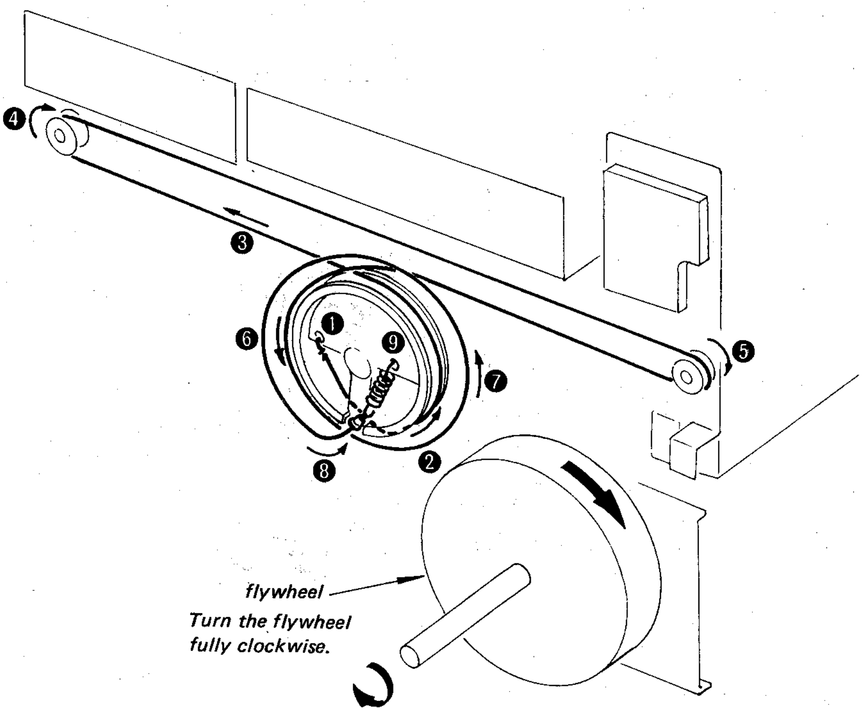
2-4. MAIN DIAL CORD STRINGING

1. Dial Cord Preparation

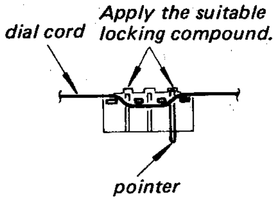

665mm
(27 ¼ inches)
dial cord 0.3mm dia.
eyelet 1.5x2.5
drum

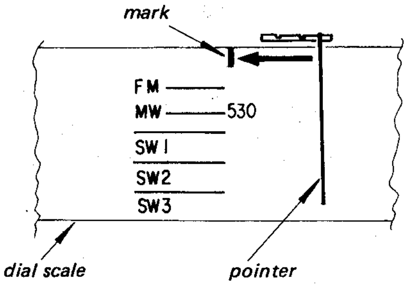


2. Proceed in the numerical order given.


❹
❸
❶
❾
❻
❼
❺
❷
❽
flywheel
Turn the flywheel
fully clockwise.

3. Pointer Installation

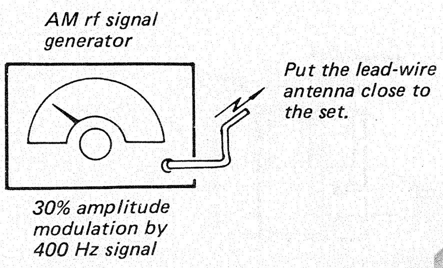

dial cord
Apply the suitable
locking compound.
pointer

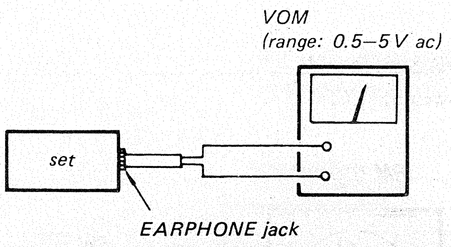

mark
FM
MW
530
SW1
SW2
SW3
dial scale
pointer

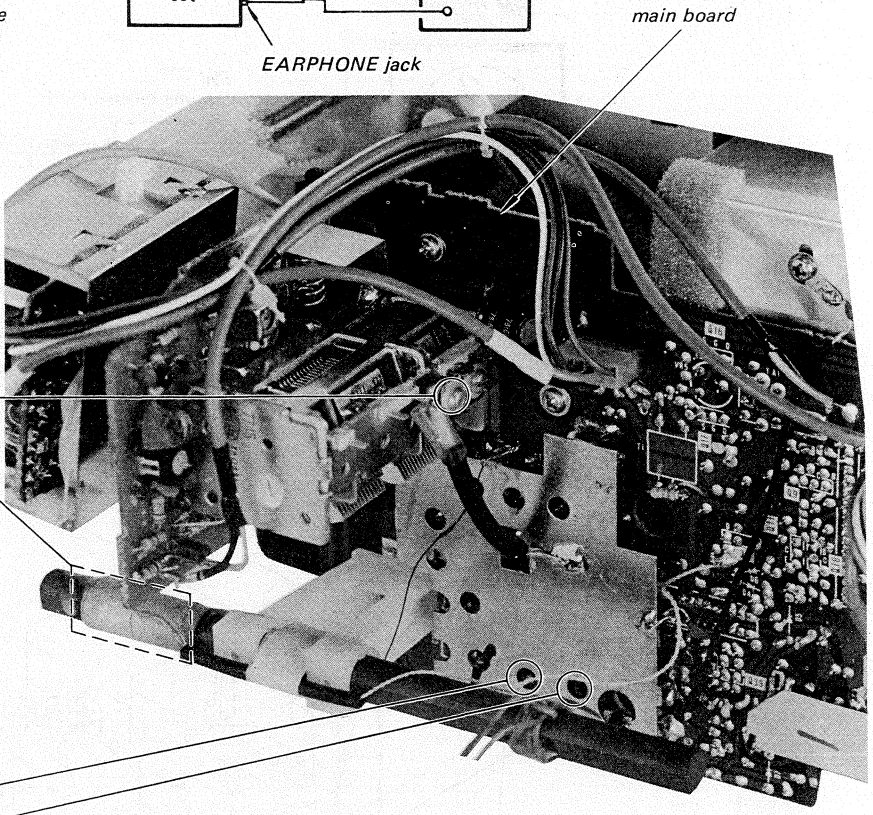
SECTION 3
ADJUSTMENTS

MW SECTION

Setting:
BAND SELECTOR Switch; MW


AM rf signal generator
Put the lead-wire antenna close to the set.
30% amplitude modulation by 400 Hz signal

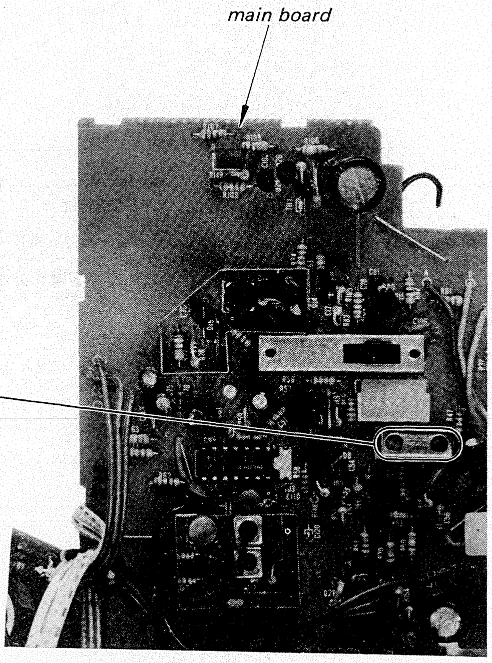

VOM (range: 0.5–5 V ac)
set
EARPHONE jack



MW TRACKING ADJUSTMENT	
Adjust for maximum reading on VOM.	
1,400 kHz	CT 9
620 kHz	L11

- Repeat the procedures in each adjustment several times, and the frequency coverage and tracking adjustments should be finally done by the trimmer capacitors.

MW FREQUENCY COVERAGE ADJUSTMENT	
Adjust for maximum reading on VTVM	
520 kHz	L 7
1,680 kHz	CT 5

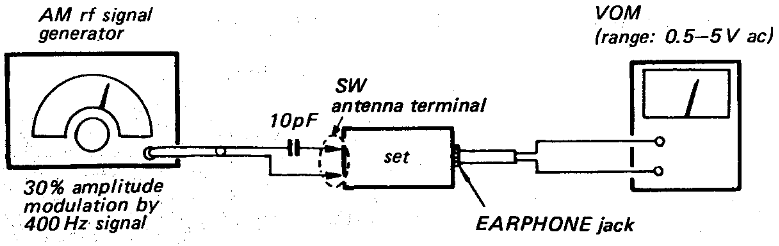


MW IF ALIGNMENT	
Adjust for maximum reading on VOM.	
455 kHz (468 kHz)	CFT

(   ): UK model

SW SECTION

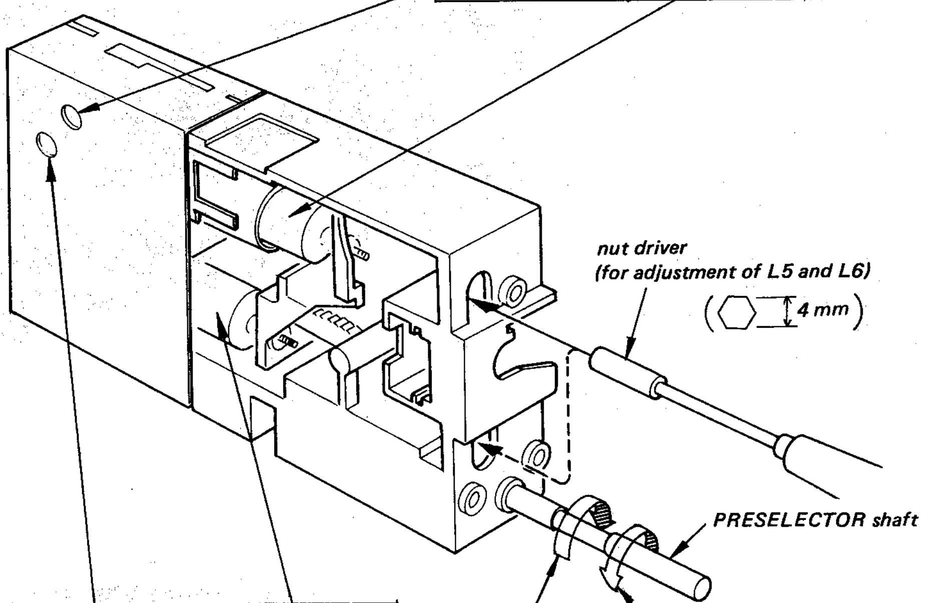
Setting:
BAND SELECTOR Switch: SW
SW ANTENNA Switch: EXT


AM rf signal generator
30% amplitude modulation by 400 Hz signal
10pF
SW antenna terminal
set
EARPHONE jack
VOM (range: 0.5–5 V ac)

SW TRACKING ADJUSTMENT 1

Adjust for maximum reading on VOM.

30 MHz	1.6 MHz
*2 CT3	*1 L5


nut driver (for adjustment of L5 and L6)
4 mm
PRESELECTOR shaft

CT4	L6
28 MHz	7 MHz

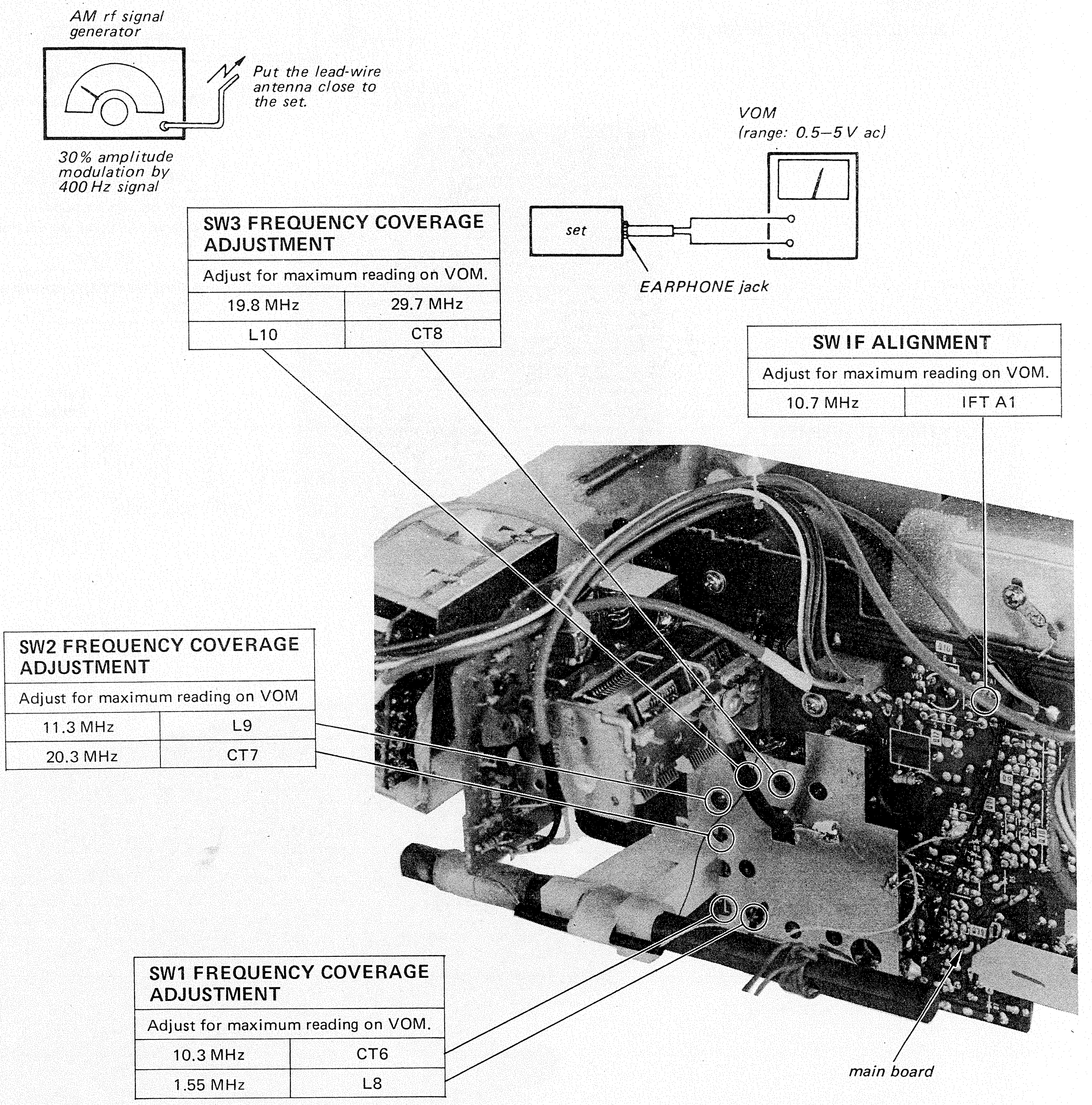
Adjust for maximum reading on VOM.

SW TRACKING ADJUSTMENT 2

*1: *Before adjusting L5, turn the shaft fully clockwise.*

*2: *Before adjusting CT3, turn the shaft fully counterclockwise.*

Setting:
BAND SELECTOR Switch: SW
SW ANTENNA Switch: ROD


AM rf signal generator
Put the lead-wire antenna close to the set.
30% amplitude modulation by 400 Hz signal
VOM (range: 0.5–5 V ac)
set
EARPHONE jack
main board

SW3 FREQUENCY COVERAGE ADJUSTMENT	
Adjust for maximum reading on VOM.	
19.8 MHz	29.7 MHz
L10	CT8

SW IF ALIGNMENT	
Adjust for maximum reading on VOM.	
10.7 MHz	IFT A1

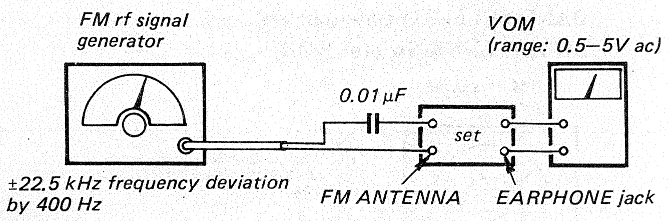
SW2 FREQUENCY COVERAGE ADJUSTMENT	
Adjust for maximum reading on VOM	
11.3 MHz	L9
20.3 MHz	CT7

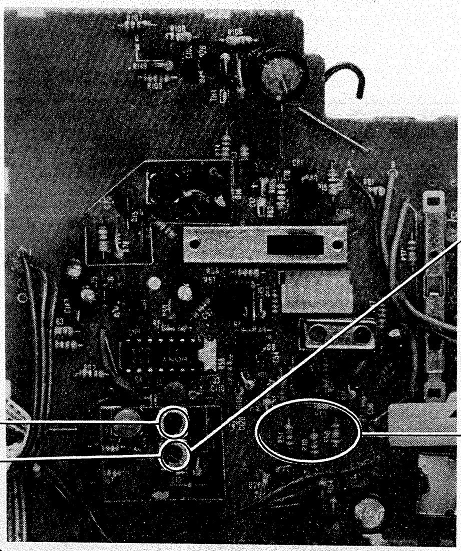
SW1 FREQUENCY COVERAGE ADJUSTMENT	
Adjust for maximum reading on VOM.	
10.3 MHz	CT6
1.55 MHz	L8

- Repeat the procedures in each adjustment several times, and the frequency coverage and tracking adjustments should be finally done by the trimmer capacitors.

FM SECTION

Setting:
BAND SELECTOR Switch: FM

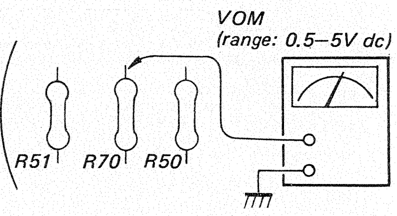

FM rf signal generator
VOM (range: 0.5–5V ac)
0.01μF
set
±22.5 kHz frequency deviation by 400 Hz
FM ANTENNA
EARPHONE jack



FM IF ALIGNMENT 2

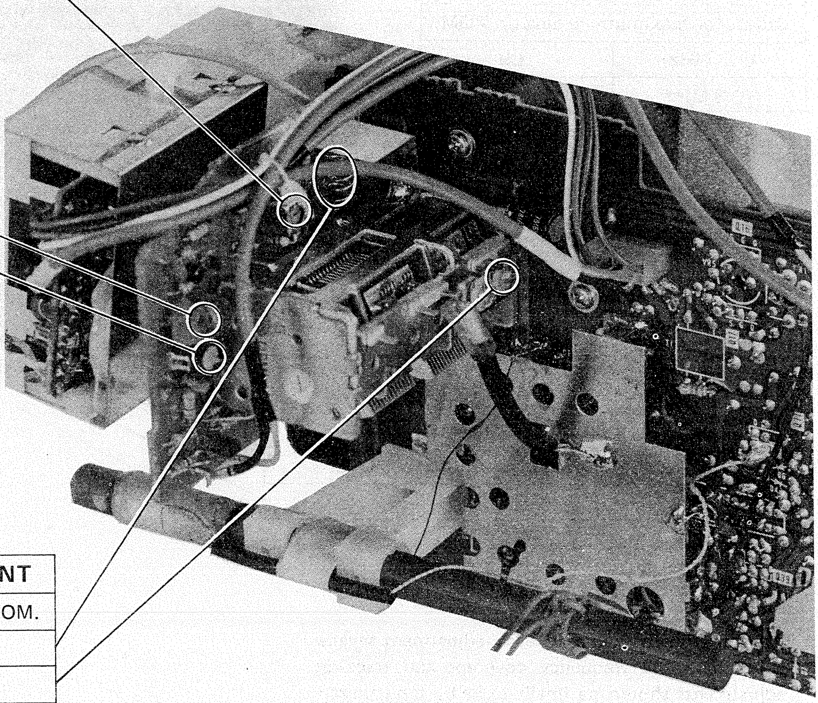
Turn off the modulation.
Connect VOM as shown below.

IFT F3
Adjust for 0V DC reading on VOM .


VOM (range: 0.5–5V dc)
R51
R70
R50

FM IF ALIGNMENT 1

10.7 MHz	IFT F2
	IFT F3
	IFT F1
Adjust for maximum reading on VOM.	



FM FREQUENCY COVERAGE ADJUSTMENT

Adjust for maximum reading on VOM.

86.5(82.5) MHz	L3
109.5(108) MHz	CT2

(   ): AEP model

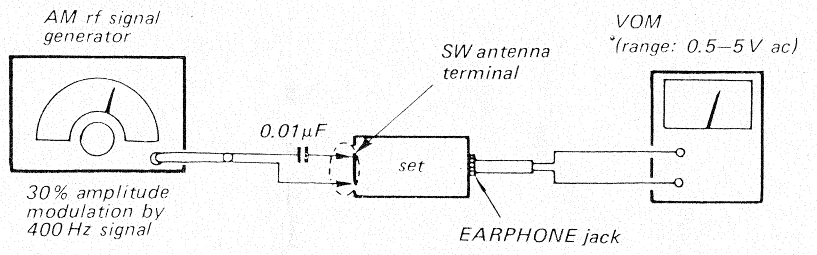
FM TRACKING ADJUSTMENT

Adjust for maximum reading on VOM.

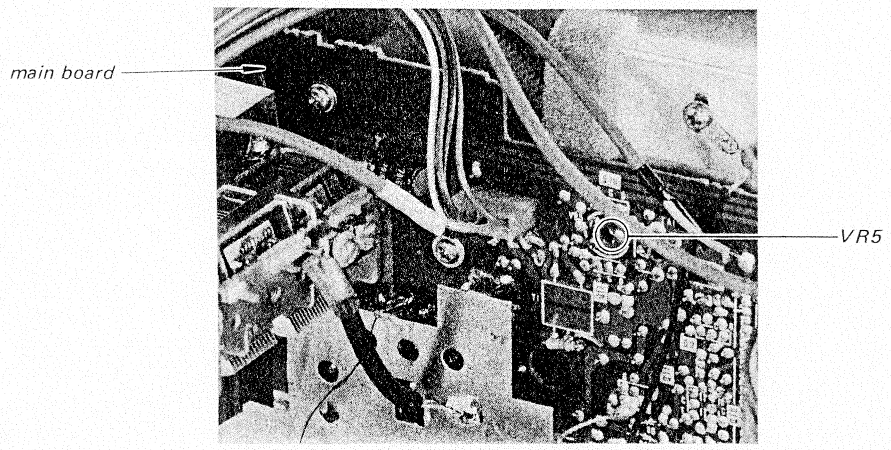
86.5(82.5) MHz	L2
109.5(108) MHz	CT1

SW 1ST MIXER BALANCE ADJUSTMENT

Setting:
BAND SELECTOR Switch: SW
SW ANTENNA Switch: EXT


AM rf signal generator
SW antenna terminal
VOM
(range: 0.5–5 V ac)
0.01μF
set
30% amplitude modulation by 400 Hz signal
EARPHONE jack

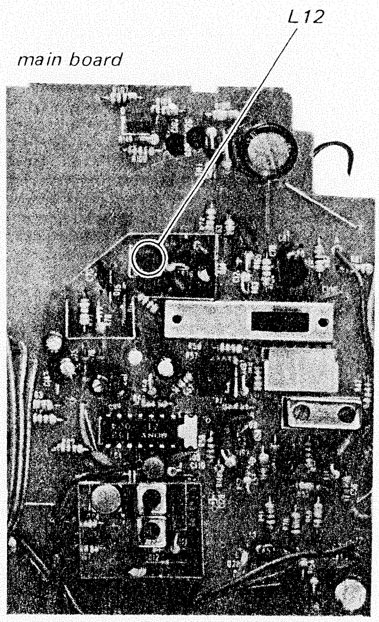
1. Set AM rf signal generator to 10.7 MHz.
2. Tune the set for maximum reading on VOM.
3. Adjust VR5 for minimum reading on VOM.


main board
VR5

BFO ADJUSTMENT

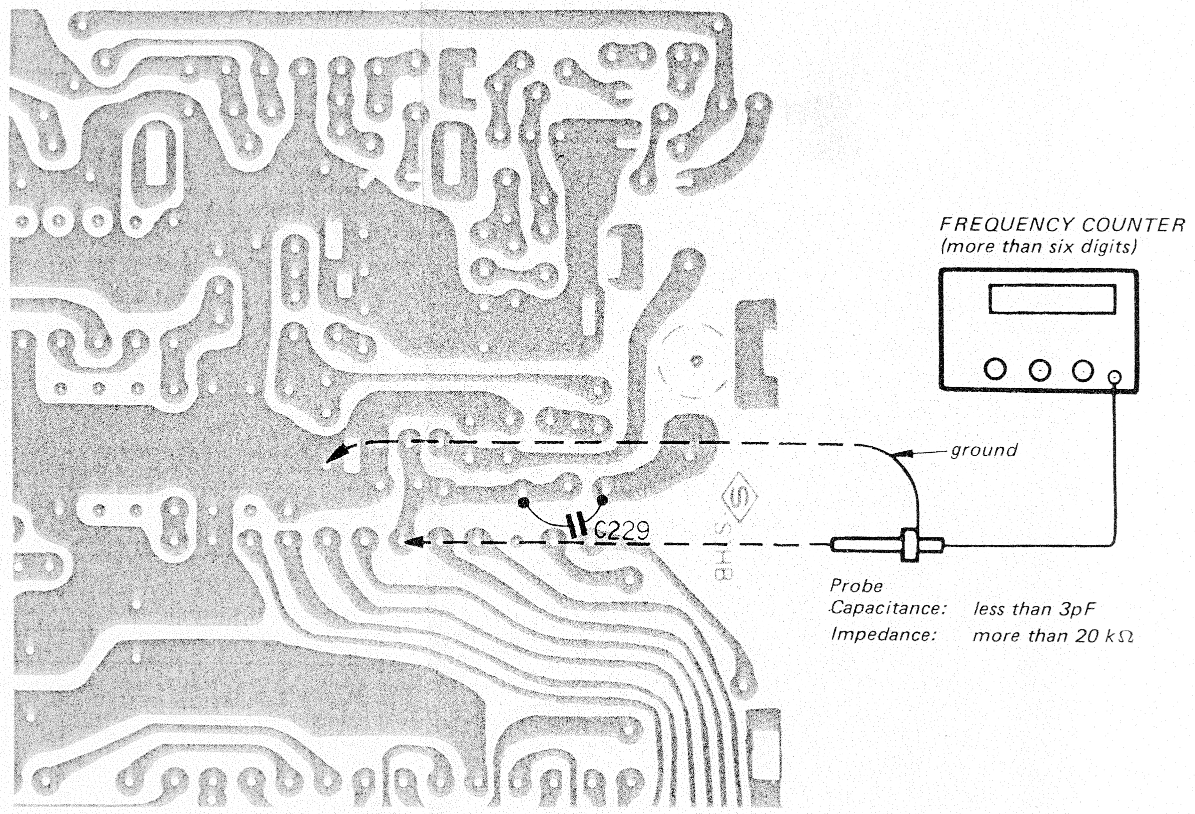
Setting: the same as the above.

1. Tune the set at mode of NARROW or WIDE and turn off the modulation.
2. Adjust L12 so that the sound level becomes equal at USB mode and LSB mode.


L12
main board

500 kHz OSCILLATOR ADJUSTMENT

[COUNTER BOARD]


FREQUENCY COUNTER
(more than six digits)
ground
C229
Probe
Capacitance: less than 3pF
Impedance: more than 20 kΩ

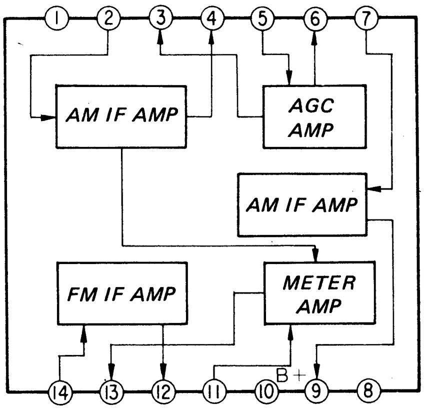
Setting:
FREQUENCY DISPLAY Switch: ON

Connect the frequency counter to pin 7 of IC6 and solder C229 as shown above. The value of C229 is determined by the counter reading listed below.

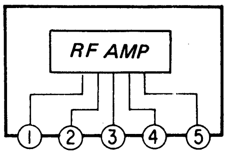
counter reading	value of C229
499993–500006 Hz	none
500007–500018 Hz	10 pF
500019–500031 Hz	33 pF
500032–500044 Hz	68 pF

IC BLOCK DIAGRAM

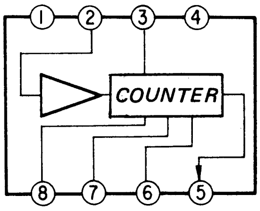
IC1 CX162


AM IF AMP
AGC AMP
AM IF AMP
FM IF AMP
METER AMP
B+
1
2
3
4
5
6
7
8
9
10
11
12
13
14

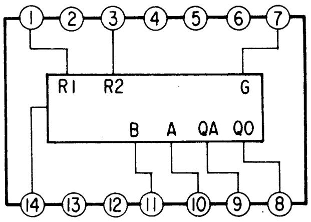
IC2 TA7060P


RF AMP
1
2
3
4
5

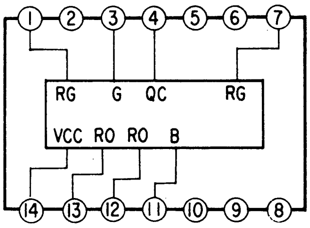
IC4 μPB551C


COUNTER
1
2
3
4
5
6
7
8

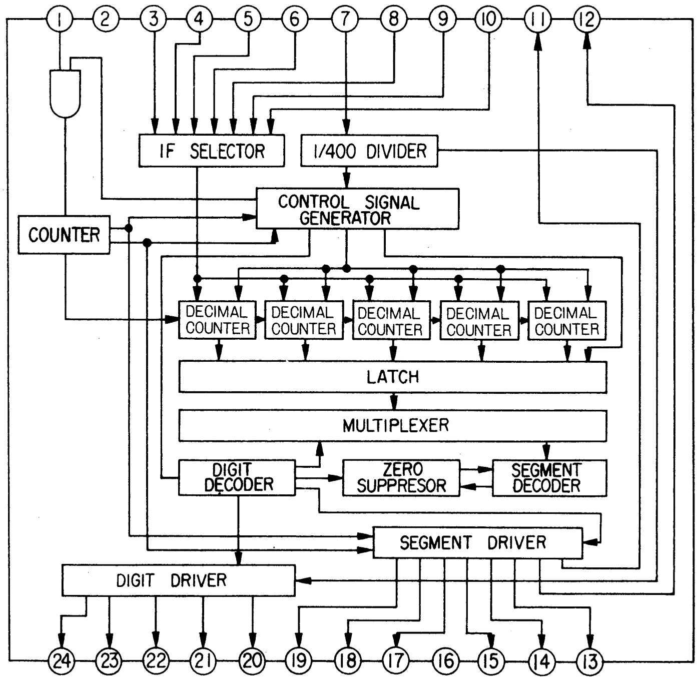
IC3 SN74LS293N


R1
R2
G
B
A
QA
QO
1
2
3
4
5
6
7
8
9
10
11
12
13
14

IC5 SN74LS290N


RG
G
QC
RG
VCC
RO
RO
B
1
2
3
4
5
6
7
8
9
10
11
12
13
14

IC6 M54825P


IF SELECTOR
1/400 DIVIDER
CONTROL SIGNAL GENERATOR
COUNTER
DECIMAL COUNTER
DECIMAL COUNTER
DECIMAL COUNTER
DECIMAL COUNTER
DECIMAL COUNTER
LATCH
MULTIPLEXER
DIGIT DECODER
ZERO SUPPRESOR
SEGMENT DECODER
SEGMENT DRIVER
DIGIT DRIVER
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24

SECTION 4
DIAGRAMS

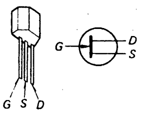
4-1. MOUNTING DIAGRAM
– Conductor Side –

Replacement Semiconductors
For replacement, use semiconductors except in ( ).

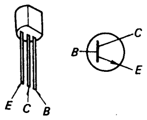
IC Block Diagram is listed on page 19.

1

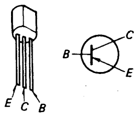
Q1, 32: 2SK42-2 (2SK42)



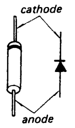
Q20: 2SC1474



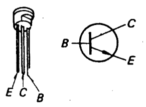
Q24: 2SA684 (2SA772)



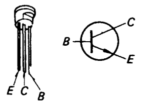
D19, 20: 10E2


cathode
anode

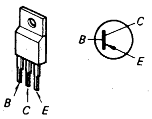
Q2, 3, 5, 6, 9
Q10, 12, 13, 27 : 2SC930 (2SC930C)



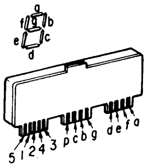
Q36, 39: 2SC930 (2SC930D)



Q28: 2SA861

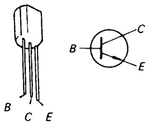


D22: SL1512

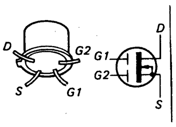

a
f g b
e c
d
5 1 2 4 3 p c b g d e f a

2

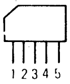
Q33, 34, 37: 2SC710 (2SC1908)



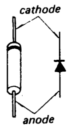
Q4: 3SK37


D
G2
S
G1
G1
G2
D
S

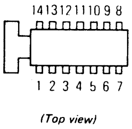
IC2: TA7060P



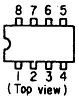
D14, 23: IT22AM (IT23)


cathode
anode

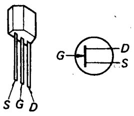
IC1: CX162


14 13 12 11 10 9 8
1 2 3 4 5 6 7
(Top view)

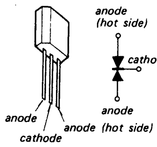
IC4: μPB551C


8 7 6 5
1 2 3 4
(Top view)

Q7, 8: 2SK23A-824 (2SK23A)

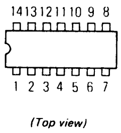


D21: IS2139C (SD115)

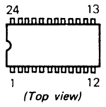

anode (hot side)
cathode
anode
anode (hot side)
anode
cathode

3

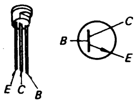
IC3: SN74LS293N


14 13 12 11 10 9 8
1 2 3 4 5 6 7
(Top view)

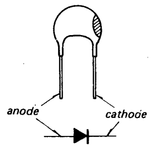
IC6: M54825P


24 13
1 12
(Top view)

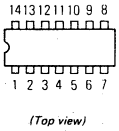
Q11: 2SC930 (2SC930E)



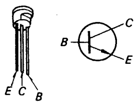
VDR1: VD1220


anode
cathode

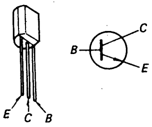
IC5: SN74LS290N


14 13 12 11 10 9 8
1 2 3 4 5 6 7
(Top view)

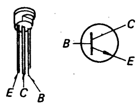
D9: 2SC930 (2SC930C)



Q14: 2SC1364

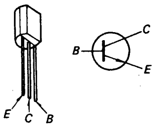


(2SC930C)

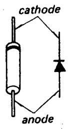


4

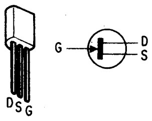
Q15, 19, 22, 25, 26
Q29–31, 40–47 : 2SC1364 (2SC1363)



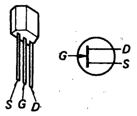
D1–8
D10, 11 : 1S1555
D15–18


cathode
anode

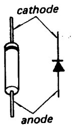
Q16, 17: 2SK107



(2SK23A)



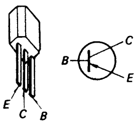
D12, 13: 1T261


cathode
anode

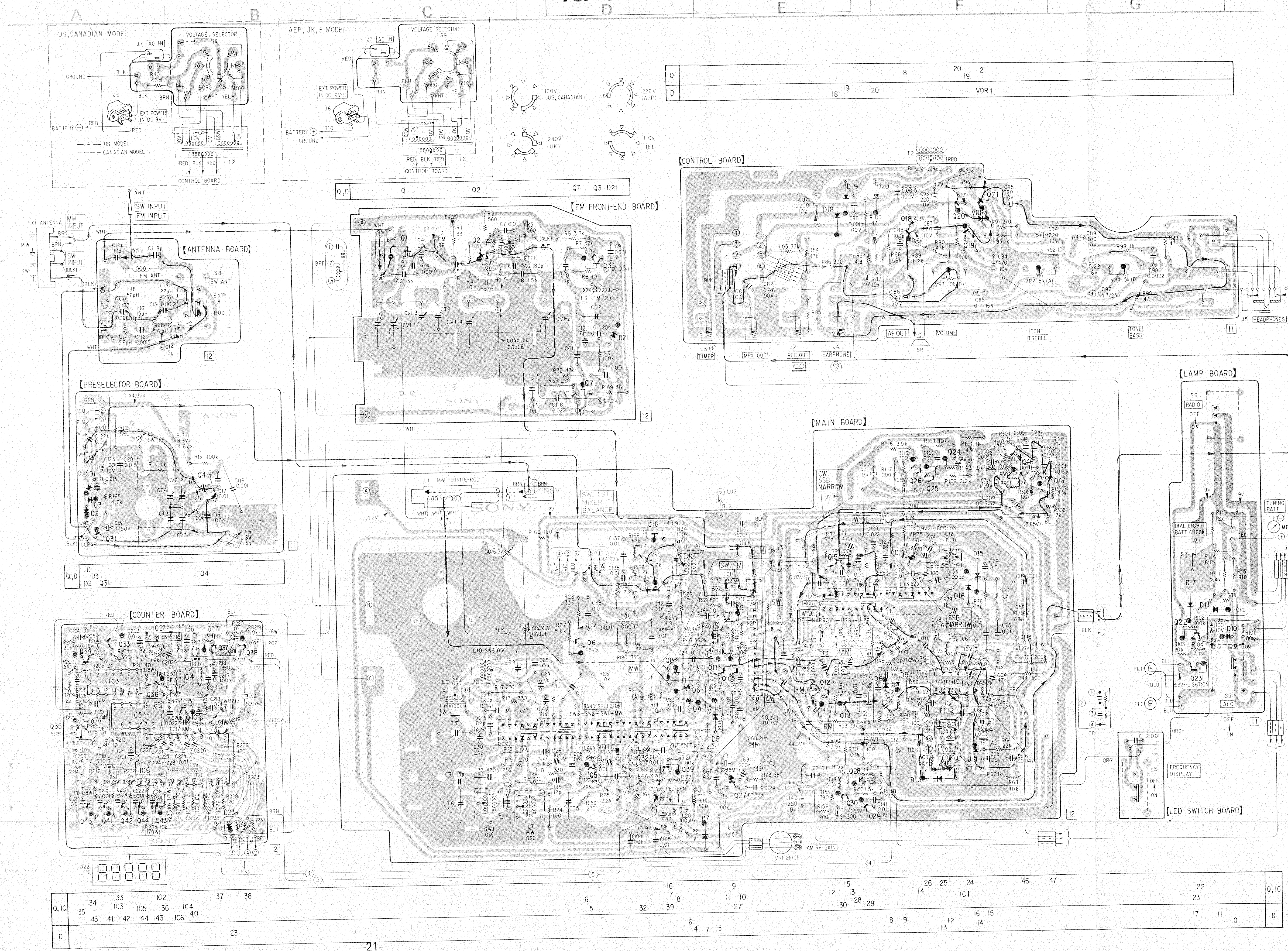
Note:
- ⊏┤← : indicates side identified with part number.
- ▬ : B + pattern
- Signal Path
  - — — — : FM
  - —·—·— : SW
  - —··—··—: MW

5

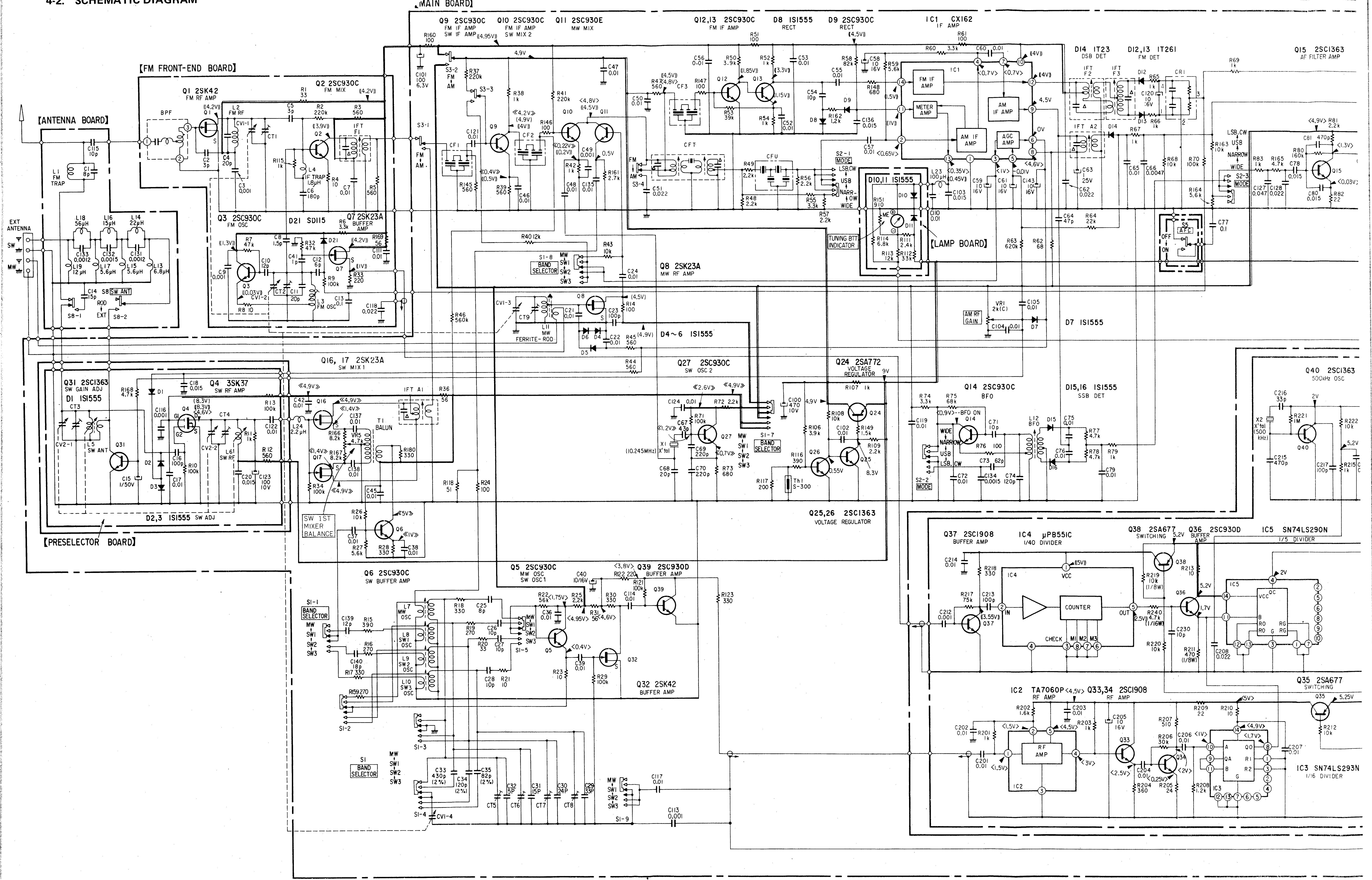
Q18, 23, 35, 38: 2SA678 (2SA677)

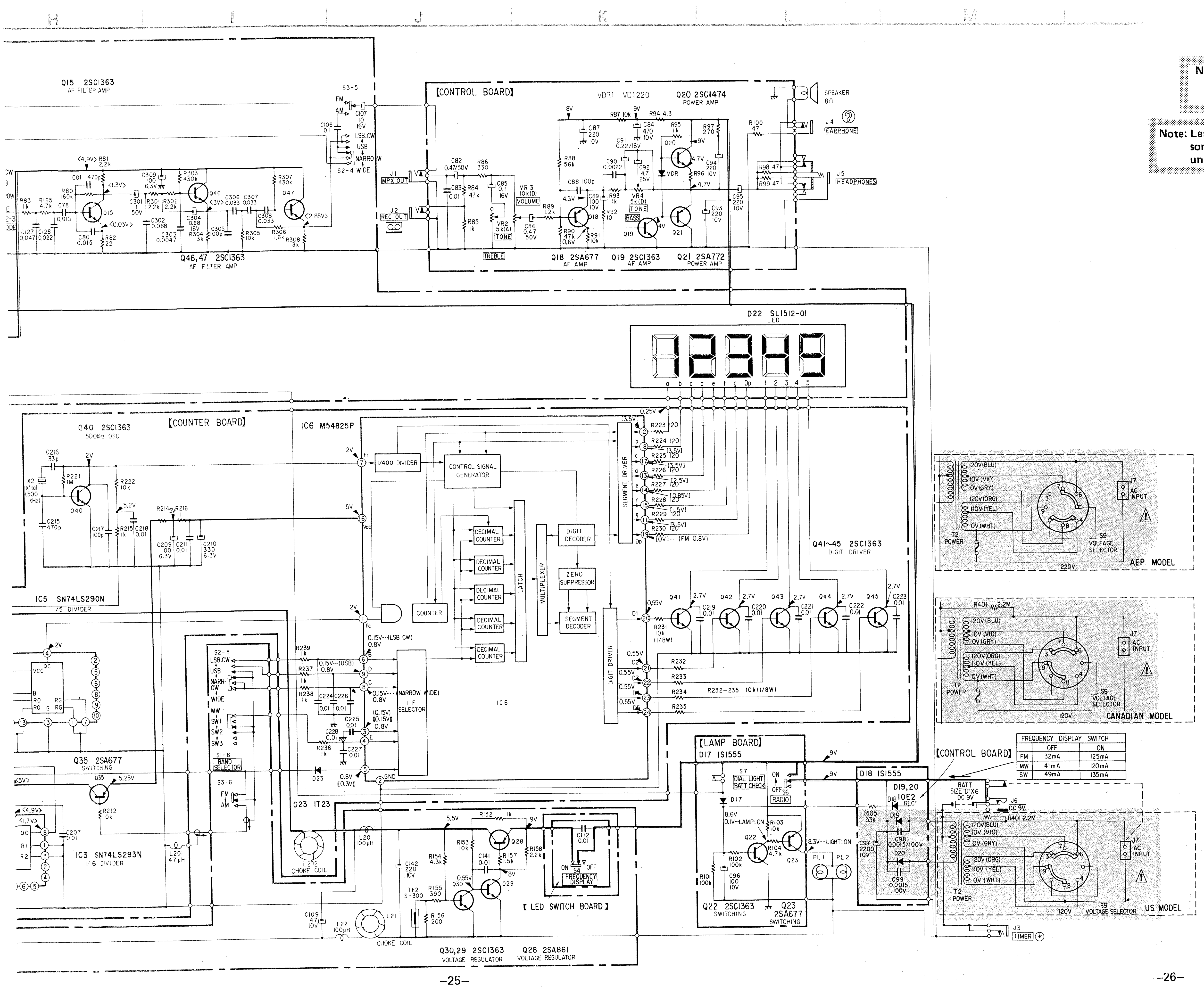


ICF-6700W ICF-6700W


A
B
C
D
E
F
G
US, CANADIAN MODEL
AEP, UK, E MODEL
VOLTAGE SELECTOR
S9
J7 AC IN
GROUND
BATTERY ⊕
EXT POWER IN DC 9V
US MODEL
CANADIAN MODEL
CONTROL BOARD
T2
120V (US, CANADIAN)
220V (AEP)
240V (UK)
110V (E)
VDR1
[CONTROL BOARD]
[FM FRONT-END BOARD]
[ANTENNA BOARD]
[PRESELECTOR BOARD]
[COUNTER BOARD]
[MAIN BOARD]
[LAMP BOARD]
[LED SWITCH BOARD]
EXT ANTENNA
MW INPUT
SW INPUT
FM INPUT
ANT
MW
SW
S8 SW ANT
L1 FM ANT
EXT ROD
COAXIAL CABLE
L11 MW FERRITE-ROD
SW 1st MIXER BALANCE
BAND SELECTOR
S1 SW3-SW2-SW1-MW
AM RF GAIN
VR1 2k(C)
CW SSB NARROW
WIDE
MODE
AF OUT
SP
VOLUME
TONE TREBLE
TONE BASS
J1 MPX OUT
J2 REC OUT
J3 TIMER
J4 EARPHONE
J5 HEADPHONES
TUNING BATT
ME
DIAL LIGHT BATT CHECK
S6 RADIO
S5 AFC
S4
FREQUENCY DISPLAY
PL1
PL2
D22 LED
LUG
SONY
Q, IC
Q, D
Q
D

4-2. SCHEMATIC DIAGRAM


A
B
C
D
E
F
G
H
MAIN BOARD
FM FRONT-END BOARD
ANTENNA BOARD
PRESELECTOR BOARD
LAMP BOARD
Q1 2SK42 FM RF AMP
Q2 2SC930C FM MIX
Q3 2SC930C FM OSC
D21 SD115
Q7 2SK23A BUFFER AMP
Q9 2SC930C FM IF AMP SW IF AMP
Q10 2SC930C FM IF AMP SW MIX 2
Q11 2SC930E MW MIX
Q12,13 2SC930C FM IF AMP
D8 1S1555 RECT
D9 2SC930C RECT
IC1 CX162 IF AMP
D14 1T23 DSB DET
D12,13 1T261 FM DET
Q15 2SC1363 AF FILTER AMP
Q8 2SK23A MW RF AMP
D4~6 1S1555
D7 1S1555
D10,11 1S1555
TUNING BTT INDICATOR
BAND SELECTOR
AM RF GAIN
Q16, 17 2SK23A SW MIX 1
Q31 2SC1363 SW GAIN ADJ
D1 1S1555
Q4 3SK37 SW RF AMP
D2,3 1S1555 SW ADJ
Q27 2SC930C SW OSC 2
Q24 2SA772 VOLTAGE REGULATOR
Q25,26 2SC1363 VOLTAGE REGULATOR
Q14 2SC930C BFO
D15,16 1S1555 SSB DET
Q40 2SC1363 500kHz OSC
SW 1ST MIXER BALANCE
Q6 2SC930C SW BUFFER AMP
Q5 2SC930C MW OSC SW OSC1
Q39 2SC930D BUFFER AMP
Q32 2SK42 BUFFER AMP
Q37 2SC1908 BUFFER AMP
IC4 μPB551C 1/40 DIVIDER
Q38 2SA677 SWITCHING
Q36 2SC930D BUFFER AMP
IC5 SN74LS290N 1/5 DIVIDER
IC2 TA7060P RF AMP
Q33,34 2SC1908 RF AMP
Q35 2SA677 SWITCHING
IC3 SN74LS293N 1/16 DIVIDER
EXT ANTENNA
FM TRAP
FERRITE-ROD
BALUN
COUNTER
MODE
LSB,CW
USB
NARROW
WIDE
AFC
X1 X'tal (10.245MHz)
X2 X'tal (500kHz)


Q15 2SC1363 AF FILTER AMP
S3-5
FM
AM
S2-4 WIDE
LSB.CW
USB
NARROW
Q46,47 2SC1363 AF FILTER AMP
J1 MPX OUT
J2 REC OUT
【CONTROL BOARD】
VDR1 VD1220
Q20 2SC1474 POWER AMP
VR3 10k(D) VOLUME
VR2 5k(A) TONE
TREBLE
VR4 5k(D) TONE BASS
Q18 2SA677 AF AMP
Q19 2SC1363 AF AMP
Q21 2SA772 POWER AMP
SPEAKER 8Ω
J4 EARPHONE
J5 HEADPHONES
D22 SL1512-01 LED
【COUNTER BOARD】
Q40 2SC1363 500kHz OSC
X2 X'tal (500 kHz)
IC6 M54825P
1/400 DIVIDER
CONTROL SIGNAL GENERATOR
DECIMAL COUNTER
LATCH
MULTIPLEXER
DIGIT DECODER
ZERO SUPPRESSOR
SEGMENT DECODER
SEGMENT DRIVER
DIGIT DRIVER
COUNTER
I F SELECTOR
Q41~45 2SC1363 DIGIT DRIVER
R232-235 10k(1/8W)
IC5 SN74LS290N 1/5 DIVIDER
Q35 2SA677 SWITCHING
IC3 SN74LS293N 1/16 DIVIDER
S2-5
S1-6 BAND SELECTOR
S3-6
D23 1T23
L202 CHOKE COIL
CHOKE COIL
Q30,29 2SC1363 VOLTAGE REGULATOR
Q28 2SA861 VOLTAGE REGULATOR
【 LED SWITCH BOARD 】
S4 FREQUENCY DISPLAY
【LAMP BOARD】
D17 1S1555
S7 DIAL LIGHT BATT CHECK
S6 RADIO
Q22 2SC1363 SWITCHING
Q23 2SA677 SWITCHING
D18 1S1555
D19,20 10E2 RECT
【CONTROL BOARD】
BATT SIZE"D"X6 DC 9V
J6 DC 9V
J3 TIMER
T2 POWER
S9 VOLTAGE SELECTOR
J7 AC INPUT
AEP MODEL
CANADIAN MODEL
US MODEL

FREQUENCY DISPLAY SWITCH		
	OFF	ON
FM	32mA	125mA
MW	41mA	120mA
SW	49mA	135mA

Note: The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

Note: Les composants identifiés par un tramé et une marque ⚠ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

Note:

- All capacitors are in μF unless otherwise noted. pF: μμF 50 WV or less are not indicated except for electrolytics.
- All resistors are in ohms, ¼W unless otherwise noted. kΩ : 1000Ω;MΩ : 1000kΩ
- ☐ : panel designation.
- ☐ : adjustment for repair.
- ━━ : B + bus.
- Voltage variations may be noted due to normal production tolerances.
- Transistor base-emitter voltages are measured on the 2.5V range.
- Readings are taken under no-signal (detuned) conditions with a VOM (20 kΩ/V).

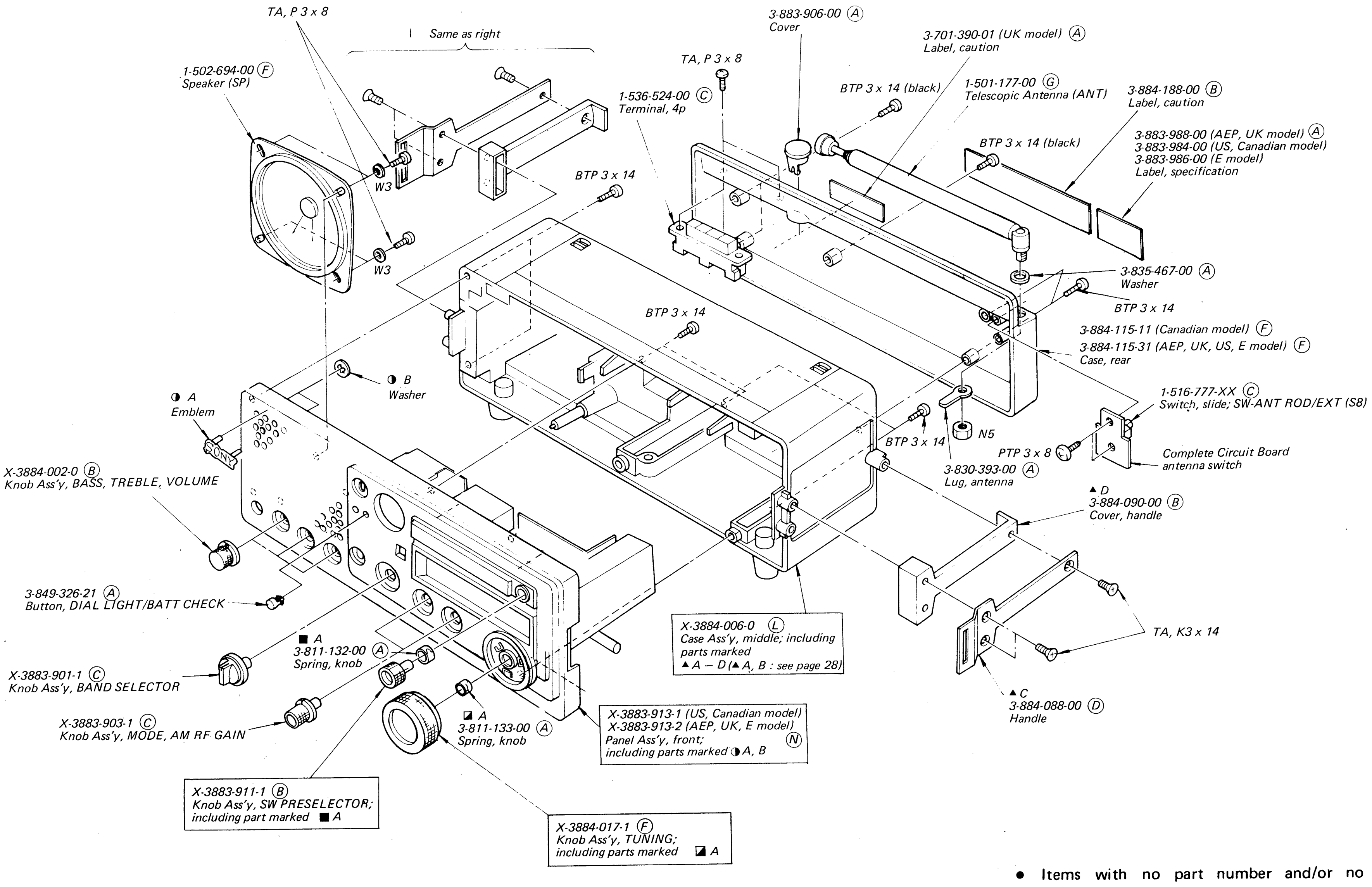
  ≪ ≫ : SW
  < > : AM
  ( ) : MW
  (( )) : FM
  [ ] : When receiving 12.345 kHz signal.
- Switch

Ref. No.	Switch	Position
S1	BAND SELECTOR	MW
S2	MODE	WIDE
S3	FM-AM	FM
S4	FREQUENCY DISPLAY	ON
S5	AFC	OFF
S6	RADIO	OFF
S7	DIAL LIGHT/ BATT CHECK	OFF
S8	SW ANT	ROD
S9	VOLTAGE SELECTOR	120V

- Transistor is used for D9.
- Δ: internal component.
- 2% indicates component tolerances.

SECTION 5
EXPLODED VIEWS

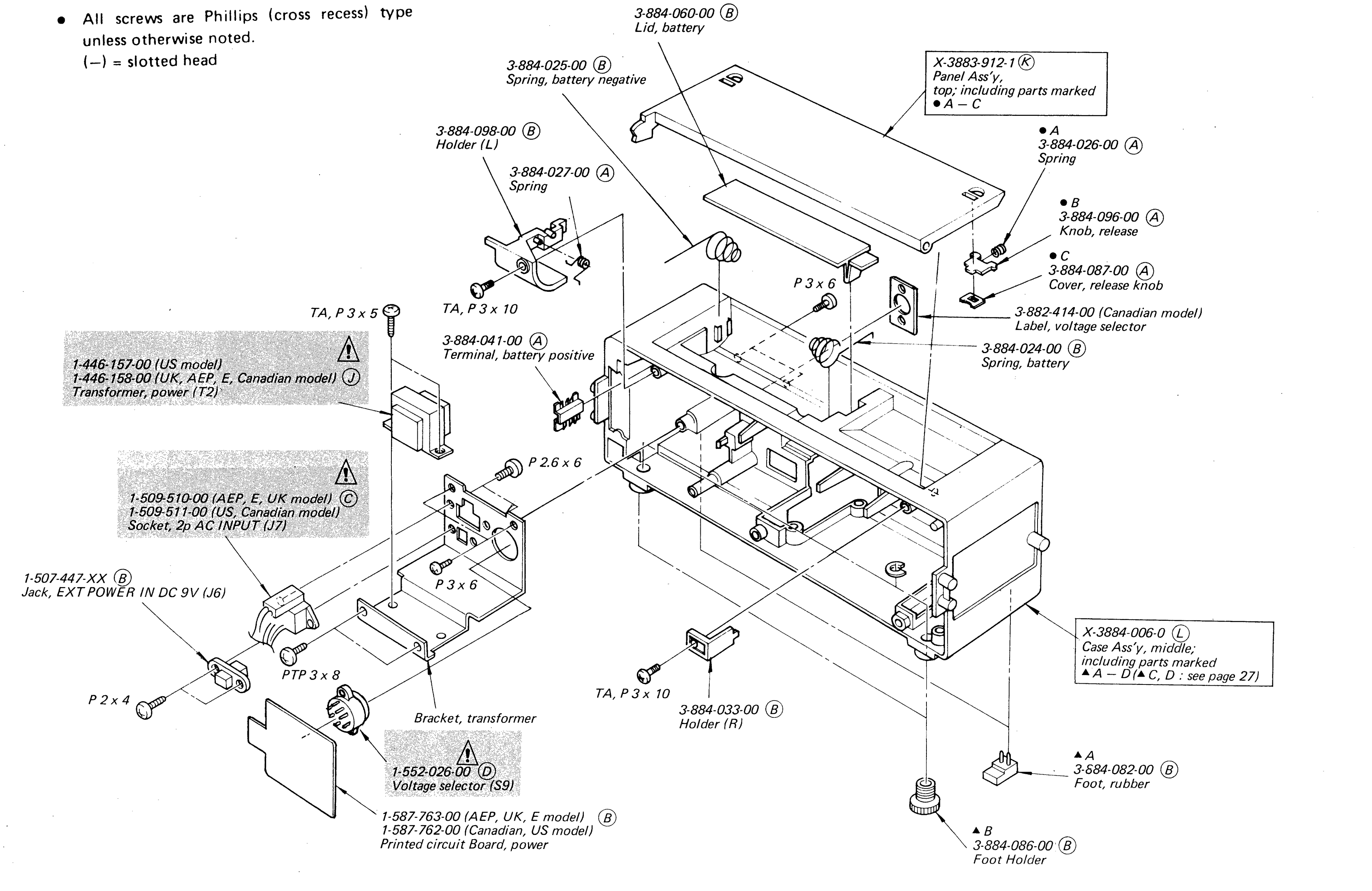
- Circled letters (Ⓐ to Ⓩ) are applicable to European models only.


TA, P 3 x 8
Same as right
1-502-694-00 Ⓕ
Speaker (SP)
W3
W3
TA, P 3 x 8
1-536-524-00 Ⓒ
Terminal, 4p
BTP 3 x 14
3-883-906-00 Ⓐ
Cover
3-701-390-01 (UK model) Ⓐ
Label, caution
BTP 3 x 14 (black)
1-501-177-00 Ⓖ
Telescopic Antenna (ANT)
3-884-188-00 Ⓑ
Label, caution
BTP 3 x 14 (black)
3-883-988-00 (AEP, UK model) Ⓐ
3-883-984-00 (US, Canadian model)
3-883-986-00 (E model)
Label, specification
3-835-467-00 Ⓐ
Washer
BTP 3 x 14
3-884-115-11 (Canadian model) Ⓕ
3-884-115-31 (AEP, UK, US, E model) Ⓕ
Case, rear
BTP 3 x 14
1-516-777-XX Ⓒ
Switch, slide; SW-ANT ROD/EXT (S8)
◑ B
Washer
◑ A
Emblem
N5
BTP 3 x 14
PTP 3 x 8
Complete Circuit Board
antenna switch
3-830-393-00 Ⓐ
Lug, antenna
X-3884-002-0 Ⓑ
Knob Ass'y, BASS, TREBLE, VOLUME
▲ D
3-884-090-00 Ⓑ
Cover, handle
3-849-326-21 Ⓐ
Button, DIAL LIGHT/BATT CHECK
X-3884-006-0 Ⓛ
Case Ass'y, middle; including parts marked
▲A – D(▲A, B : see page 28)
TA, K3 x 14
■ A
3-811-132-00 Ⓐ
Spring, knob
X-3883-901-1 Ⓒ
Knob Ass'y, BAND SELECTOR
▲C
3-884-088-00 Ⓓ
Handle
X-3883-903-1 Ⓒ
Knob Ass'y, MODE, AM RF GAIN
◪ A
3-811-133-00 Ⓐ
Spring, knob
X-3883-913-1 (US, Canadian model)
X-3883-913-2 (AEP, UK, E model)
Panel Ass'y, front; Ⓝ
including parts marked ◑A, B
X-3883-911-1 Ⓑ
Knob Ass'y, SW PRESELECTOR;
including part marked ■ A
X-3884-017-1 Ⓕ
Knob Ass'y, TUNING;
including parts marked ◪ A

- Items with no part number and/or no description are not stocked because they are seldom required for routine service.
- All screws are Phillips (cross recess) type unless otherwise noted.
  (–) = slotted head

5-2.

- Items with no part number and/or no description are not stocked because they are seldom required for routine service.
- All screws are Phillips (cross recess) type unless otherwise noted.
  (–) = slotted head
- Circled letters (Ⓐ to Ⓩ) are applicable to European models only.

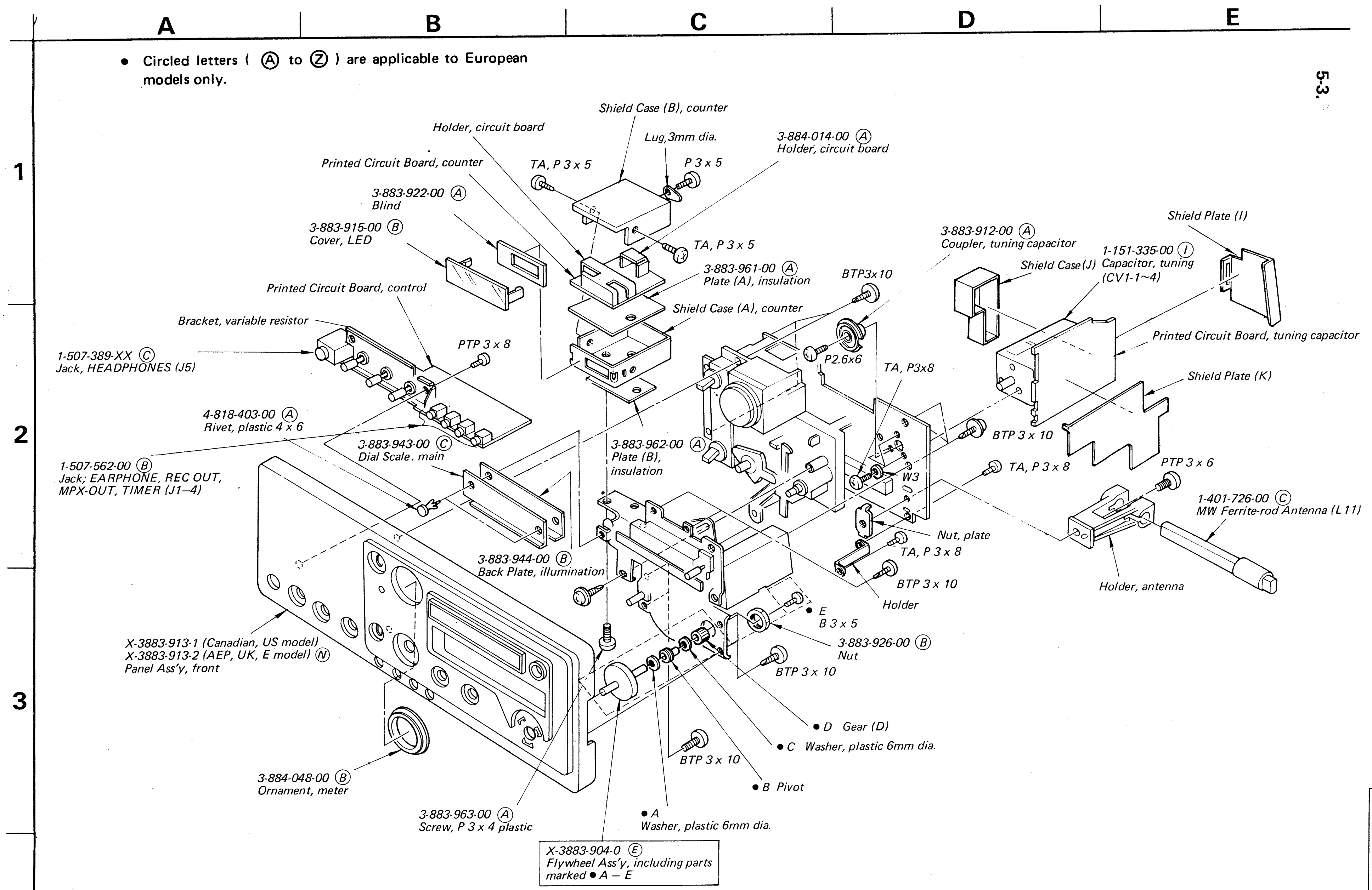

3-884-060-00 Ⓑ
Lid, battery
3-884-025-00 Ⓑ
Spring, battery negative
X-3883-912-1 Ⓚ
Panel Ass'y,
top; including parts marked
● A – C
3-884-098-00 Ⓑ
Holder (L)
3-884-027-00 Ⓐ
Spring
● A
3-884-026-00 Ⓐ
Spring
● B
3-884-096-00 Ⓐ
Knob, release
● C
3-884-087-00 Ⓐ
Cover, release knob
P 3 x 6
TA, P 3 x 5
TA, P 3 x 10
3-882-414-00 (Canadian model)
Label, voltage selector
3-884-041-00 Ⓐ
Terminal, battery positive
3-884-024-00 Ⓑ
Spring, battery
⚠
1-446-157-00 (US model)
1-446-158-00 (UK, AEP, E, Canadian model) Ⓙ
Transformer, power (T2)
P 2.6 x 6
⚠
1-509-510-00 (AEP, E, UK model) Ⓒ
1-509-511-00 (US, Canadian model)
Socket, 2p AC INPUT (J7)
P 3 x 6
1-507-447-XX Ⓑ
Jack, EXT POWER IN DC 9V (J6)
X-3884-006-0 Ⓛ
Case Ass'y, middle;
including parts marked
▲A – D(▲C, D : see page 27)
PTP 3 x 8
TA, P 3 x 10
P 2 x 4
Bracket, transformer
3-884-033-00 Ⓑ
Holder (R)
⚠
1-552-026-00 Ⓓ
Voltage selector (S9)
▲ A
3-884-082-00 Ⓑ
Foot, rubber
1-587-763-00 (AEP, UK, E model) Ⓑ
1-587-762-00 (Canadian, US model)
Printed circuit Board, power
▲ B
3-884-086-00 Ⓑ
Foot Holder

Note: The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

Note: Les composants identifiés par un tramé et une marque ⚠ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

5-3.

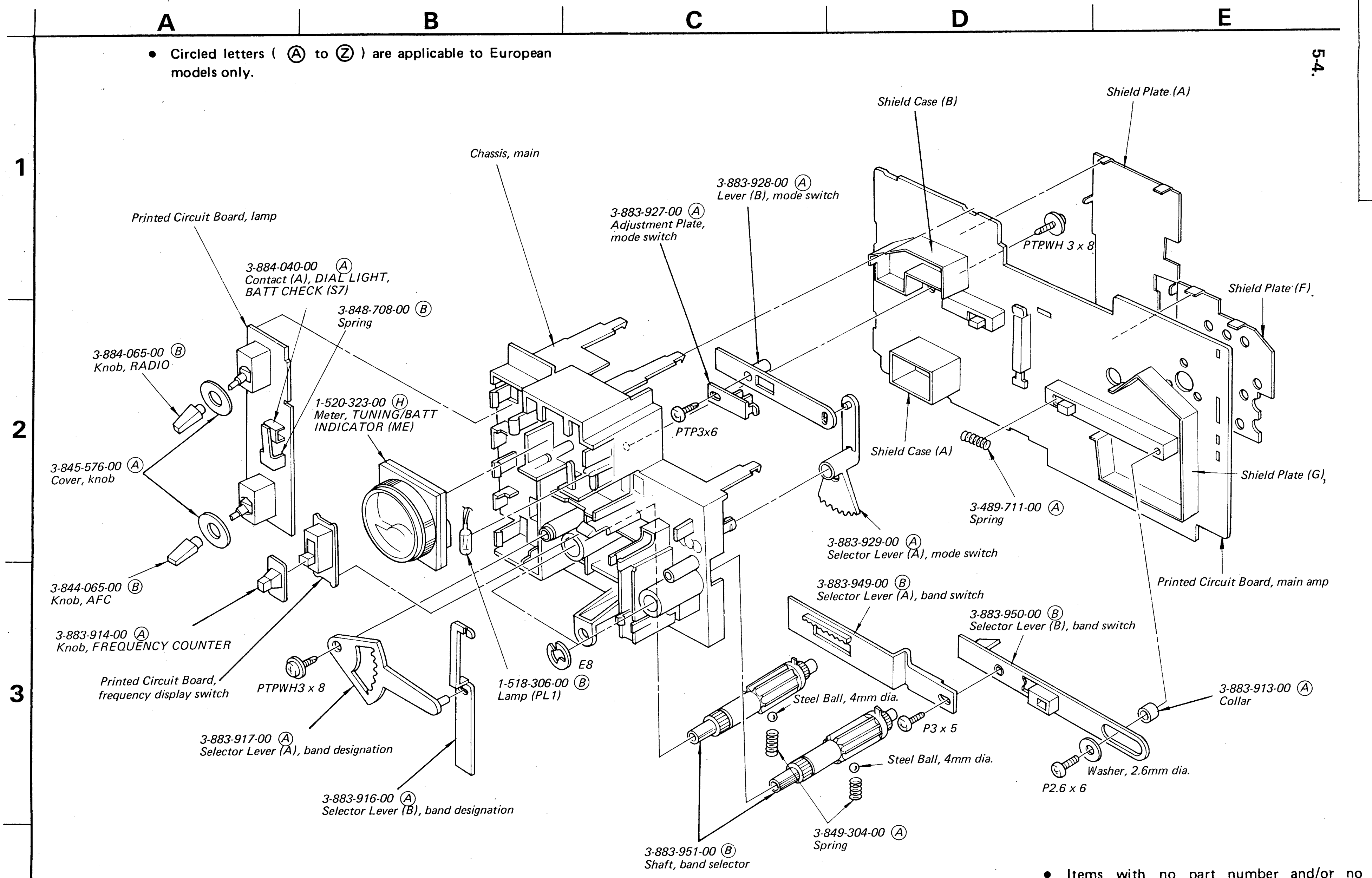
- Circled letters (Ⓐ to Ⓩ) are applicable to European models only.


A
B
C
D
E
1
2
3
4
Shield Case (B), counter
Holder, circuit board
Lug,3mm dia.
3-884-014-00 Ⓐ
Holder, circuit board
Printed Circuit Board, counter
TA, P 3 x 5
P 3 x 5
3-883-922-00 Ⓐ
Blind
3-883-915-00 Ⓑ
Cover, LED
TA, P 3 x 5
3-883-912-00 Ⓐ
Coupler, tuning capacitor
Shield Plate (I)
1-151-335-00 Ⓘ
Capacitor, tuning
(CV1-1~4)
Shield Case(J)
3-883-961-00 Ⓐ
Plate (A), insulation
BTP3x10
Printed Circuit Board, control
Shield Case (A), counter
Bracket, variable resistor
Printed Circuit Board, tuning capacitor
PTP 3 x 8
P2.6x6
1-507-389-XX Ⓒ
Jack, HEADPHONES (J5)
TA, P3x8
Shield Plate (K)
4-818-403-00 Ⓐ
Rivet, plastic 4 x 6
BTP 3 x 10
3-883-962-00 Ⓐ
Plate (B),
insulation
3-883-943-00 Ⓒ
Dial Scale, main
PTP 3 x 6
1-507-562-00 Ⓑ
Jack; EARPHONE, REC OUT,
MPX-OUT, TIMER (J1–4)
TA, P 3 x 8
W3
1-401-726-00 Ⓒ
MW Ferrite-rod Antenna (L11)
Nut, plate
TA, P 3 x 8
3-883-944-00 Ⓑ
Back Plate, illumination
BTP 3 x 10
Holder, antenna
Holder
• E
B 3 x 5
X-3883-913-1 (Canadian, US model)
X-3883-913-2 (AEP, UK, E model) Ⓝ
Panel Ass'y, front
3-883-926-00 Ⓑ
Nut
BTP 3 x 10
• D Gear (D)
• C Washer, plastic 6mm dia.
BTP 3 x 10
3-884-048-00 Ⓑ
Ornament, meter
• B Pivot
3-883-963-00 Ⓐ
Screw, P 3 x 4 plastic
• A
Washer, plastic 6mm dia.
X-3883-904-0 Ⓔ
Flywheel Ass'y, including parts
marked • A – E

- Items with no part number and/or no description are not stocked because they are seldom required for routine service.
- All screws are Phillips (cross recess) type unless otherwise noted.
  (–) = slotted head

5-4.

- Circled letters (Ⓐ to Ⓩ) are applicable to European models only.


A
B
C
D
E
1
2
3
4
Shield Case (B)
Shield Plate (A)
Chassis, main
3-883-928-00 Ⓐ
Lever (B), mode switch
3-883-927-00 Ⓐ
Adjustment Plate,
mode switch
PTPWH 3 x 8
Printed Circuit Board, lamp
3-884-040-00 Ⓐ
Contact (A), DIAL LIGHT,
BATT CHECK (S7)
Shield Plate (F)
3-848-708-00 Ⓑ
Spring
3-884-065-00 Ⓑ
Knob, RADIO
1-520-323-00 Ⓗ
Meter, TUNING/BATT
INDICATOR (ME)
PTP3x6
Shield Case (A)
Shield Plate (G)
3-845-576-00 Ⓐ
Cover, knob
3-489-711-00 Ⓐ
Spring
3-883-929-00 Ⓐ
Selector Lever (A), mode switch
3-844-065-00 Ⓑ
Knob, AFC
Printed Circuit Board, main amp
3-883-949-00 Ⓑ
Selector Lever (A), band switch
3-883-950-00 Ⓑ
Selector Lever (B), band switch
3-883-914-00 Ⓐ
Knob, FREQUENCY COUNTER
E8
Printed Circuit Board,
frequency display switch
PTPWH3 x 8
1-518-306-00 Ⓑ
Lamp (PL1)
3-883-913-00 Ⓐ
Collar
Steel Ball, 4mm dia.
P3 x 5
3-883-917-00 Ⓐ
Selector Lever (A), band designation
Steel Ball, 4mm dia.
Washer, 2.6mm dia.
P2.6 x 6
3-883-916-00 Ⓐ
Selector Lever (B), band designation
3-849-304-00 Ⓐ
Spring
3-883-951-00 Ⓑ
Shaft, band selector

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- All screws are Phillips (cross recess) type unless otherwise noted.
  (–) = slotted head

Ref. No.	Part No.	Description		
L24	1-407-182-XXⒶ	Microinductor, 2.2μH		
L201	1-407-165-XXⒶ	Microinductor, 47μH		
L202	1-407-856-00 Ⓒ	Choke		

TRANSFORMERS

Ref. No.	Part No.	Description		
T1	1-417-064-00 Ⓑ	Balun		
T2	⚠1-446-157-00	Power		(US model)
T2	⚠1-446-158-00 Ⓙ	Power		(AEP, UK, E, Canadian model)
IFT A1	1-404-021-00 Ⓑ	AM IFT		
IFT A2	1-404-100-00 Ⓑ	AM IFT		
IFT F1	1-403-872-00 Ⓑ	FM IFT		
IFT F2	1-403-959-00 Ⓑ	FM Discriminator		
IFT F3	1-403-953-00 Ⓑ	FM Discriminator		

CAPACITORS

All capacitors are in μF and ceramic unless otherwise noted.
50WV or less are not indicated except for electrolytics and tantalum.
pF: μμF, elect: electrolytic

Ref. No.	Part No.	Description		
C1	1-102-945-11 Ⓐ	8p		
C2	1-102-936-11 Ⓐ	3p		
C3	1-102-074-11 Ⓐ	0.001		
C4	1-102-958-11 Ⓐ	20p		
C5	1-102-936-11 Ⓐ	3p		
C6	1-102-976-11 Ⓐ	180p		
C7	1-101-923-11 Ⓐ	0.01		
C8	1-161-249-11 Ⓐ	1.5p		
C9	1-102-074-11 Ⓐ	0.001		
C10	1-102-949-11 Ⓐ	12p		
C11	1-102-958-11 Ⓐ	20p		
C12	1-102-943-11 Ⓐ	6p		
C13	1-101-797-11 Ⓐ	0.1		(semiconductor)
C14	1-102-951-11 Ⓐ	15p		
C15	1-121-391-11 Ⓐ	1	50V	elect
C16	1-161-271-11 Ⓐ	100p		
C17	1-101-923-11 Ⓐ	0.01		
C18	1-161-033-11 Ⓐ	0.015		(semiconductor)
C20	1-161-033-11 Ⓐ	0.015		(semiconductor)
C21	1-161-379-11 Ⓐ	0.01		

Note: The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

- Circled letters (Ⓐ to Ⓩ) are applicable to European models only.

Ref. No.	Part No.	Description		
C22	1-101-923-11 Ⓐ	0.01		
C23	1-102-973-11 Ⓐ	100p		
C24	1-161-379-11 Ⓐ	0.01		
C25	1-102-945-11 Ⓐ	8p		
C26–28	1-102-947-11 Ⓐ	10p		
C29	1-102-724-11 Ⓐ	33p		
C30	1-102-802-11 Ⓐ	24p		
C31	1-102-880-11 Ⓐ	15p		
C32	1-102-280-11 Ⓐ	5p		
C33	1-107-269-11 Ⓐ	430p		silvered mica
C34	1-107-262-11 Ⓑ	120p		silvered mica
C35	1-107-260-11 Ⓑ	82p		silvered mica
C36–38	1-161-379-11 Ⓐ	0.01		
C39	1-101-923-11 Ⓐ	0.01		
C40	1-121-651-11 Ⓐ	10	16V	elect
C41	1-102-934-11 Ⓐ	1p		
C42	1-101-923-11 Ⓐ	0.01		
C45	1-161-379-11 Ⓐ	0.01		
C46	1-101-923-11 Ⓐ	0.01		
C47	1-161-032-11 Ⓐ	0.01		(semiconductor)
C48	1-161-379-11 Ⓐ	0.01		
C49	1-102-074-11 Ⓐ	0.001		
C50	1-161-379-11 Ⓐ	0.01		
C51	1-101-924-11 Ⓐ	0.022		
C52, 53	1-161-379-11 Ⓐ	0.01		
C54	1-102-947-11 Ⓐ	10p		
C55	1-101-923-11 Ⓐ	0.01		
C56	1-161-379-11 Ⓐ	0.01		
C57	1-161-379-11 Ⓐ	0.01		
C58, 59	1-121-651-11 Ⓐ	10	16V	elect
C60	1-101-923-11 Ⓐ	0.01		
C61	1-121-651-11 Ⓐ	10	10V	elect
C62	1-161-034-11 Ⓐ	0.022		(semiconductor)
C63	1-131-236-11 Ⓑ	1	50V	tantalum
C64	1-101-880-11 Ⓐ	47p		
C65	1-161-032-11 Ⓐ	0.01		(semiconductor)
C66	1-161-030-11 Ⓐ	0.0047		(semiconductor)
C67	1-102-966-11 Ⓐ	43p		
C68	1-102-958-11 Ⓐ	20p		
C69, 70	1-102-110-11 Ⓐ	220p		

Note: Les composants identifiés par un tramé et une marque ⚠ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

Ref. No.	Part No.	Description		
C71	1-102-947-11 Ⓐ	10p		
C72	1-101-923-11 Ⓐ	0.01		
C73	1-102-650-11 Ⓐ	62p		
C74	1-102-656-11 Ⓐ	120p		
C75, 76	1-161-379-11 Ⓐ	0.01		
C77	1-101-797-11 Ⓐ	0.1		(semiconductor)
C78	1-161-033-11 Ⓐ	0.015		(semiconductor)
C79	1-101-923-11 Ⓐ	0.01		
C80	1-161-033-11 Ⓐ	0.015		(semiconductor)
C81	1-102-114-11 Ⓐ	470p		
C82	1-121-726-11 Ⓐ	0.47	50V	elect
C83	1-161-032-11 Ⓐ	0.01		(boundary layer)
C84	1-121-938-11 Ⓑ	470	10V	elect
C85	1-127-019-11 Ⓐ	0.1	16V	elect
C86	1-121-726-11 Ⓐ	0.47	50V	elect
C87	1-123-072-11 Ⓐ	220	10V	elect
C88	1-102-973-11 Ⓐ	100p		
C89	1-121-414-11 Ⓐ	100	10V	elect
C90	1-102-121-11 Ⓐ	0.0022		
C91	1-127-020-11 Ⓐ	0.22	16V	elect
C92	1-121-395-11 Ⓐ	4.7	25V	elect
C93–95	1-123-072-11 Ⓐ	220	10V	elect
C96	1-121-414-11 Ⓐ	100	10V	elect
C97	⚠1-123-074-11 Ⓑ	2200	10V	elect
C98, 99	⚠1-108-647-12 Ⓐ	0.0015	100V	mylar
C100	1-121-938-11 Ⓐ	470	10V	elect
C101	1-121-413-11 Ⓐ	100	6.3V	elect
C102	1-101-923-11 Ⓐ	0.01		
C103	1-161-033-11 Ⓐ	0.015		(semiconductor)
C104, 105	1-101-923-11 Ⓐ	0.01		
C106	1-101-797-11 Ⓐ	0.1		(semiconductor)
C107	1-121-651-11 Ⓐ	10	10V	elect
C109	1-121-352-11 Ⓐ	47	10V	elect
C110	1-161-032-11 Ⓐ	0.01		(semiconductor)
C111	1-161-379-11 Ⓐ	0.01		
C112	1-101-923-11 Ⓐ	0.01		
C113	1-102-074-11 Ⓐ	0.001		
C114	1-101-923-11 Ⓐ	0.01		
C115	1-102-947-11 Ⓐ	10p		
C116	1-102-074-11 Ⓐ	0.001		

Note: The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

Note: Circled letters (Ⓐ to Ⓩ) are applicable to European models only.

Ref. No.	Part No.	Description		
C117	1-161-032-11 Ⓐ	0.01		(semiconductor)
C118	1-161-034-11 Ⓐ	0.022		(semiconductor)
C119	1-101-923-11 Ⓐ	0.01		
C120	1-121-651-11 Ⓐ	10	16V	elect
C121, 122	1-101-923-11 Ⓐ	0.01		
C123	1-121-414-11 Ⓐ	100	10V	elect
C124	1-101-923-11 Ⓐ	0.01		
C127	1-161-036-11 Ⓐ	0.047		(semiconductor)
C128	1-161-034-11 Ⓐ	0.022		(semiconductor)
C131	1-161-002-11 Ⓐ	0.0012		(semiconductor)
C132	1-161-003-11 Ⓐ	0.0015		(semiconductor)
C133	1-161-002-11 Ⓐ	0.0012		(semiconductor)
C134	1-161-027-11 Ⓐ	0.0015		(semiconductor)
C135	1-161-379-11 Ⓐ	0.01		
C136	1-161-033-11 Ⓐ	0.015		(semiconductor)
C137	1-161-379-11 Ⓐ	0.01		
C138	1-101-923-11 Ⓐ	0.01		
C139	1-102-949-11 Ⓐ	12p		
C140	1-102-953-11 Ⓐ	18p		
C141	1-101-923-11 Ⓐ	0.01		
C142	1-123-072-11 Ⓐ	220	10V	elect
C143	1-121-651-11 Ⓐ	10	10V	elect
C201–204	1-101-923-11 Ⓐ	0.01		
C205	1-121-651-11 Ⓐ	10	16V	elect
C206, 207	1-101-923-11 Ⓐ	0.01		
C208	1-101-924-11 Ⓐ	0.022		
C209	1-121-413-11 Ⓐ	100	6.3V	elect
C210	1-121-751-11 Ⓑ	330	6.3V	elect
C211	1-101-923-11 Ⓐ	0.01		
C212	1-102-074-11 Ⓐ	0.001		
C213	1-102-106-11 Ⓐ	100p		
C214	1-101-923-11 Ⓐ	0.01		
C215	1-102-114-11 Ⓐ	470p		
C216	1-102-963-11 Ⓐ	33p		
C217	1-102-973-11 Ⓐ	100p		
C218–224	1-101-923-11 Ⓐ	0.01		
C225, 226	1-161-032-11 Ⓐ	0.01		(semiconductor)
C227, 228	1-101-923-11 Ⓐ	0.01		
C230	1-102-947-11 Ⓐ	10p		

Note: Les composants identifiés par un tramé et une marque ⚠ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

- Circled letters (Ⓐ to Ⓩ) are applicable to European models only.

Ref. No.	*Part No.*	*Description*
C301	1-121-391-11 Ⓐ	1 50V elect
C302	1-161-037-11 Ⓐ	0.068 (semiconductor)
C303	1-161-030-11 Ⓐ	0.0047 (semiconductor)
C304	1-127-378-11 Ⓑ	0.68 elect
C305	1-102-973-11 Ⓐ	100p
C306–308	1-161-035-11 Ⓐ	0.033 (semiconductor)
C309	1-121-413-11 Ⓐ	100 6.3V elect
CT1, 2	1-141-138-XXⒷ	Trimmer
CT5	1-141-140-XXⒷ	Trimmer
CT6–8	1-141-171-00 Ⓑ	Trimmer
CV1-1~1-4	1-151-335-00 Ⓘ	Tuning
CV2-1, 2-2	1-151-303-00 Ⓔ	Tuning

RESISTORS

All resistors are in ohms. Common ¼W carbon resistors are omitted.
Refer to the list on page 36 for their part numbers.

Ref. No.	*Part No.*	*Description*
R401	⚠1-202-723-21	2.2M ½W composition (US, Canadian model)
VR1	1-226-226-00 Ⓑ	2k-C, variable; AM RF GAIN
VR2	1-226-162-00 Ⓑ	5k-A, variable; TREBLE
VR3	1-226-161-00 Ⓑ	10k-D, variable; VOLUME
VR4	1-226-163-00 Ⓑ	5k-D, variable; BASS
VR5	1-224-251-XXⒷ	4.7k-B, adjustable; SW MIX

JACKS

Ref. No.	*Part No.*	*Description*
J1–4	1-507-562-00 Ⓑ	MPX OUT, REC OUT, TIMER, EARPHONE
J5	1-507-389-XXⒸ	HEADPHONES
J6	1-507-447-XXⒷ	EXT POWER IN, DC 9V
J7	⚠1-509-511-00	Socket, AC INPUT (US, Canadian model)
J7	⚠1-509-510-00 Ⓒ	Socket, AC INPUT (AEP, UK, E model)

SWITCHES

Ref. No.	*Part No.*	*Description*
S1	1-514-316-00 Ⓓ	Slide, BAND SELECTOR
S2	1-513-281-00 Ⓒ	Slide, MODE
S3	1-514-861-XXⒸ	Slide, AM-FM
S4	1-552-327-00 Ⓑ	Slide, FREQUENCY DISPLAY
S5	1-552-127-00 Ⓑ	Lever-slide, AFC
S6	1-552-127-00 Ⓑ	Lever-slide, RADIO
S7	3-848-708-00 Ⓑ 3-884-040-00 Ⓐ	Spring Contact (A) DIAL LIGHT, BATT CHECK
S8	1-516-777-XXⒸ	Slide, SW-ANT ROD/EXT
S9	⚠1-552-026-00 Ⓓ	Voltage Selector

MISCELLANEOUS

Ref. No.	*Part No.*	*Description*
ANT	1-501-177-00 Ⓖ	Telescopic Antenna
BPF	1-231-392-00 Ⓑ	Bandpass Filter
CF1–3	1-527-184-XXⒷ	Ceramic Filter, 10.7 MHz
CFT	1-403-164-00 Ⓒ	Ceramic Filter, tripple tune
CFU	1-527-319-00 Ⓓ	Ceramic Filter
CR1	1-231-202-00 Ⓑ	Encapsulated Component
ME	1-520-323-00 Ⓗ	Meter, TUNING/BATT INDICATOR
PL1, 2	1-518-306-00 Ⓑ	Lamp, 8V 30mA
SP	1-502-694-00 Ⓕ	Speaker
X1	1-527-339-00 Ⓓ	Crystal, 10.245 MHz
X2	1-527-269-11 Ⓛ	Crystal, 500 kHz
	1-536-524-00 Ⓒ	Terminal, 4p; SW, MW
	⚠1-534-840-XXⒺ	Cord, power; DK-38 (AEP model)
	⚠1-551-218-00 Ⓔ	Cord, power; DK-50 (UK model)
	⚠1-551-235-00	Cord, power; DK-51 (E model)
	⚠1-551-504-00	Cord, power; (US, Canadian model)
	⚠1-551-521-00	Cord, power; (E model)

ACCESSORIES AND PACKING MATERIALS

Part No.	*Description*
3-883-994-00 Ⓓ	Carton
3-993-171-11 Ⓑ	Pin, antenna terminal
3-995-831-11 Ⓒ	Manual, instruction (AEP, UK, E model)
3-995-831-21	Manual, instruction (Canadian model)
3-993-172-31	Manual, instruction; French (Canadian model)
3-995-831-21	Manual, instruction (US model)
3-794-233-21	Leaflet (US model)
3-701-616-00 Ⓐ	Bag, plastic
3-701-627-00 Ⓐ	Bag, plastic; manual
3-884-120-00 Ⓒ	Cushion (R)
3-884-119-00 Ⓒ	Cushion (L)
3-551-895-00 Ⓑ	Bag, set protection

Note: The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

Note: Les composants identifiés par un tramé et une marque ⚠ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

1/4 WATT CARBON RESISTORS Ⓐ

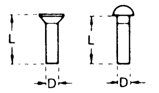
Note: Circled letter Ⓐ is applicable to European models only.

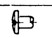
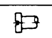
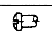
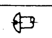
Ω	*Part No.*	Ω	*Part No.*	Ω	*Part No.*	Ω	*Part No.*	Ω	*Part No.*	Ω	*Part No.*	Ω	*Part No.*
1.0	1-244-601-11	10	1-244-625-11	100	1-244-649-11	1.0k	1-244-673-11	10k	1-244-697-11	100k	1-244-721-11	1.0M	1-244-745-11
1.1	1-244-602-11	11	1-244-626-11	110	1-244-650-11	1.1k	1-244-674-11	11k	1-244-698-11	110k	1-244-722-11	1.1M	1-244-746-11
1.2	1-244-603-11	12	1-244-627-11	120	1-244-651-11	1.2k	1-244-675-11	12k	1-244-699-11	120k	1-244-723-11	1.2M	1-244-747-11
1.3	1-244-604-11	13	1-244-628-11	130	1-244-652-11	1.3k	1-244-676-11	13k	1-244-700-11	130k	1-244-724-11	1.3M	1-244-748-11
1.5	1-244-605-11	15	1-244-629-11	150	1-244-653-11	1.5k	1-244-677-11	15k	1-244-701-11	150k	1-244-725-11	1.5M	1-244-749-11
1.6	1-244-606-11	16	1-244-630-11	160	1-244-654-11	1.6k	1-244-678-11	16k	1-244-702-11	160k	1-244-726-11	1.6M	1-244-750-11
1.8	1-244-607-11	18	1-244-631-11	180	1-244-655-11	1.8k	1-244-679-11	18k	1-244-703-11	180k	1-244-737-11	1.8M	1-244-751-11
2.0	1-244-608-11	20	1-244-632-11	200	1-244-656-11	2.0k	1-244-680-11	20k	1-244-704-11	200k	1-244-728-11	2.0M	1-244-752-11
2.2	1-244-609-11	22	1-244-633-11	220	1-244-657-11	2.2k	1-244-681-11	22k	1-244-705-11	220k	1-244-729-11	2.2M	1-244-753-11
2.4	1-244-610-11	24	1-244-634-11	240	1-244-658-11	2.4k	1-244-682-11	24k	1-244-706-11	240k	1-244-730-11	2.4M	1-244-754-11
2.7	1-244-611-11	27	1-244-635-11	270	1-244-659-11	2.7k	1-244-683-11	27k	1-244-707-11	270k	1-244-731-11	2.7M	1-244-755-11
3.0	1-244-612-11	30	1-244-636-11	300	1-244-660-11	3.0k	1-244-684-11	30k	1-244-708-11	300k	1-244-732-11	3.0M	1-244-756-11
3.3	1-244-613-11	33	1-244-637-11	330	1-244-661-11	3.3k	1-244-685-11	33k	1-244-709-11	330k	1-244-733-11	3.3M	1-244-757-11
3.6	1-244-614-11	36	1-244-638-11	360	1-244-662-11	3.6k	1-244-686-11	36k	1-244-710-11	360k	1-244-734-11	3.6M	1-244-758-11
3.9	1-244-615-11	39	1-244-639-11	390	1-244-663-11	3.9k	1-244-687-11	39k	1-244-711-11	390k	1-244-735-11	3.9M	1-244-759-11
4.3	1-244-616-11	43	1-244-640-11	430	1-244-664-11	4.3k	1-244-688-11	43k	1-244-712-11	430k	1-244-736-11	4.3M	1-244-760-11
4.7	1-244-617-11	47	1-244-641-11	470	1-244-665-11	4.7k	1-244-689-11	47k	1-244-713-11	470k	1-244-737-11	4.7M	1-244-761-11
5.1	1-244-618-11	51	1-244-642-11	510	1-244-666-11	5.1k	1-244-690-11	51k	1-244-714-11	510k	1-244-738-11	5.1M	1-244-762-11
5.6	1-244-619-11	56	1-244-643-11	560	1-244-667-11	5.6k	1-244-691-11	56k	1-244-715-11	560k	1-244-739-11		
6.2	1-244-620-11	62	1-244-644 11	620	1-244-668-11	6.2k	1-244-692-11	62k	1-244-716-11	620k	1-244-740-11		
6.8	1-244-621-11	68	1-244-645-11	680	1-244-669-11	6.8k	1-244-693-11	68k	1-244-717-11	680k	1-244-741-11		
7.5	1-244-622-11	75	1-244-646-11	750	1-244-670-11	7.5k	1-244-694-11	75k	1-244-718-11	750k	1-244-742-11		
8.2	1-244-623-11	82	1-244-647-11	820	1-244-671-11	8.2k	1-244-695-11	82k	1-244-719-11	820k	1-244-743-11		
9.1	1-244-624-11	91	1-244-648-11	910	1-244-672-11	9.1k	1-244-696-11	91k	1-244-720-11	910k	1-244-744-11		

HARDWARE NOMENCLATURE

Screw: – P 3 x 10

L: Length in mm
D: Diameter in mm
Type of head
Indicated slotted-head only.
Unless otherwise indicated, it means cross-recessed head (Phillips type).

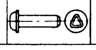
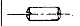
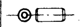
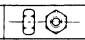
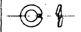


Reference Designation	Shape	Description	Remarks
		SCREWS	
P		pan-head screw	binding-head (B) screw for replacement
PWH		pan-head screw with washer face	binding-head (B) screw and flat washer for replacement
PS PSP		pan-head screw with spring washer	binding-head (B) screw and spring washer for replacement
PSW PSPW		pan-head screw with spring and flat washers	binding-head (B) screw and spring and flat washers for replacement
R		round-head screw	binding-head (B) screw for replacement
K		flat-countersunk-head screw	
RK		oval-countersunk-head screw	
B		binding-head screw	
T		truss-head screw	binding-head (B) screw for replacement
F		flat-fillister-head screw	
RF		fillister-head screw	
BV		braizer-head screw	

Nut, Washer, Retaining ring:

N 3

Diameter of usable screw or shaft
Reference designation

Reference Designation	Shape	Description	Remarks
		SELF-TAPPING SCREWS	
TA		self-tapping screw	ex: TA, P 3 x 10
PTP		pan-head self-tapping screw	binding-head self-tapping (TA, B) screw for replacement
PTPWH		pan-head self-tapping screw with washer face	binding-head self tapping (TA, B) screw and flat washer for replacement
PTTWH		pan-head thread-rolling screw with washer face	binding-head (B) screw and flat washer for replacement
		SET SCREWS	
SC		set screw	
SC		hexagon-socket set screw	ex: SC 2.6 x 4, hexagon socket
		NUT	
N		nut	
		WASHERS	
W		flat washer	
SW		spring washer	
LW		internal-tooth lock washer	ex: LW3, internal
LW		external-tooth lock washer	ex: LW3, external
		RETAINING RINGS	
E		retaining ring	
G		grip-type retaining ring	

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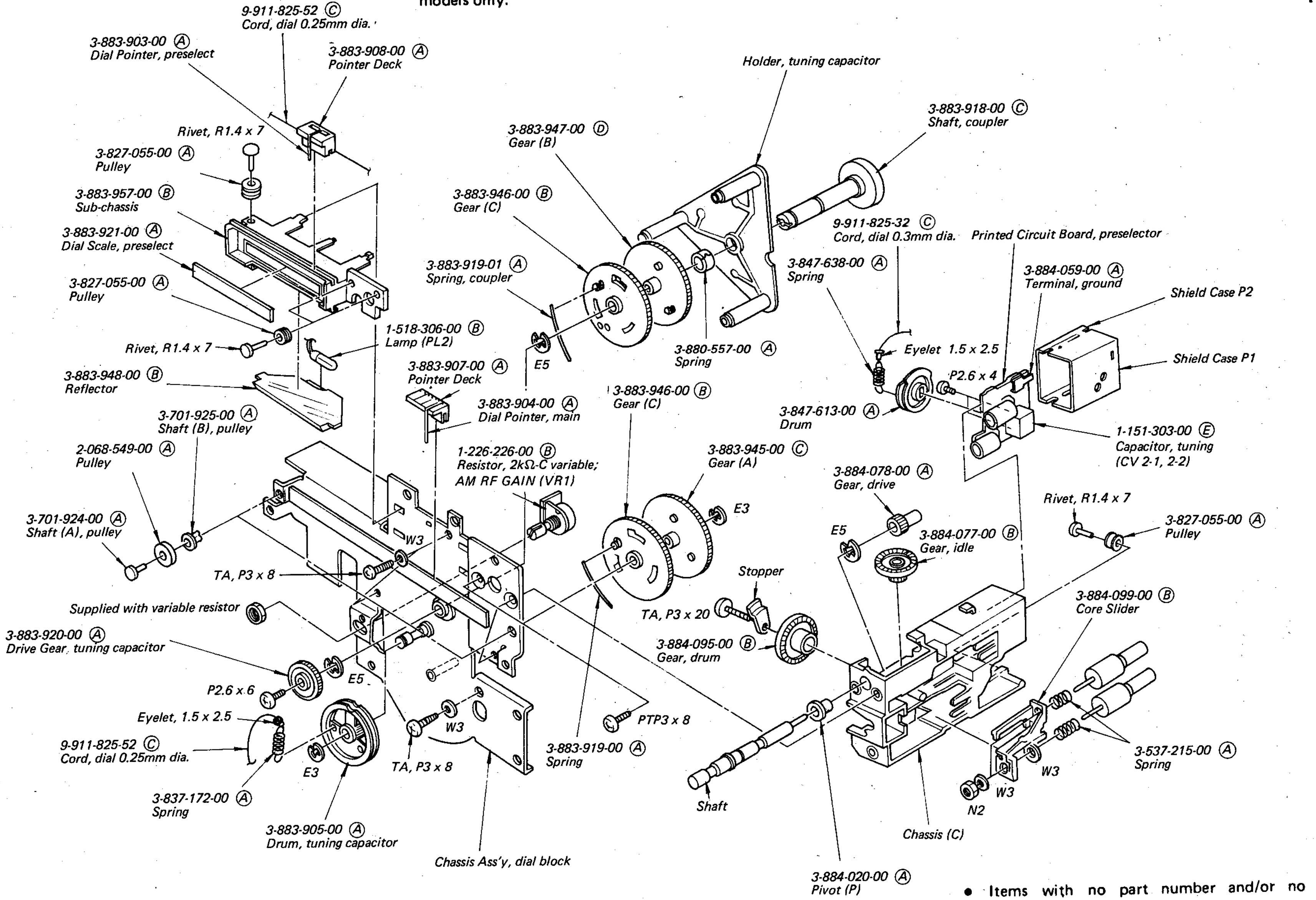
5-5.

- Circled letters (Ⓐ to Ⓩ) are applicable to European models only.


A
B
C
D
E
1
2
3
4
9-911-825-52 Ⓒ
Cord, dial 0.25mm dia.
3-883-903-00 Ⓐ
Dial Pointer, preselect
3-883-908-00 Ⓐ
Pointer Deck
Holder, tuning capacitor
3-883-918-00 Ⓒ
Shaft, coupler
Rivet, R1.4 x 7
3-883-947-00 Ⓓ
Gear (B)
3-827-055-00 Ⓐ
Pulley
3-883-957-00 Ⓑ
Sub-chassis
3-883-946-00 Ⓑ
Gear (C)
9-911-825-32 Ⓒ
Cord, dial 0.3mm dia.
Printed Circuit Board, preselector
3-883-921-00 Ⓐ
Dial Scale, preselect
3-883-919-01 Ⓐ
Spring, coupler
3-847-638-00 Ⓐ
Spring
3-884-059-00 Ⓐ
Terminal, ground
Shield Case P2
3-827-055-00 Ⓐ
Pulley
1-518-306-00 Ⓑ
Lamp (PL2)
3-880-557-00 Ⓐ
Spring
Eyelet 1.5 x 2.5
Shield Case P1
Rivet, R1.4 x 7
E5
P2.6 x 4
3-883-948-00 Ⓑ
Reflector
3-883-907-00 Ⓐ
Pointer Deck
3-883-946-00 Ⓑ
Gear (C)
3-883-904-00 Ⓐ
Dial Pointer, main
3-847-613-00 Ⓐ
Drum
3-701-925-00 Ⓐ
Shaft (B), pulley
1-151-303-00 Ⓔ
Capacitor, tuning
(CV 2-1, 2-2)
2-068-549-00 Ⓐ
Pulley
1-226-226-00 Ⓑ
Resistor, 2kΩ-C variable;
AM RF GAIN (VR1)
3-883-945-00 Ⓒ
Gear (A)
3-884-078-00 Ⓐ
Gear, drive
Rivet, R1.4 x 7
E3
3-701-924-00 Ⓐ
Shaft (A), pulley
W3
E5
3-884-077-00 Ⓑ
Gear, idle
3-827-055-00 Ⓐ
Pulley
TA, P3 x 8
Stopper
Supplied with variable resistor
3-884-099-00 Ⓑ
Core Slider
TA, P3 x 20
3-883-920-00 Ⓐ
Drive Gear, tuning capacitor
3-884-095-00 Ⓑ
Gear, drum
E5
P2.6 x 6
PTP3 x 8
Eyelet, 1.5 x 2.5
W3
9-911-825-52 Ⓒ
Cord, dial 0.25mm dia.
E3
TA, P3 x 8
3-883-919-00 Ⓐ
Spring
3-537-215-00 Ⓐ
Spring
W3
W3
3-837-172-00 Ⓐ
Spring
Shaft
N2
3-883-905-00 Ⓐ
Drum, tuning capacitor
Chassis (C)
Chassis Ass'y, dial block
3-884-020-00 Ⓐ
Pivot (P)

- Items with no part number and/or no description are not stocked because they are seldom required for routine service.
- All screws are Phillips (cross recess) type unless otherwise noted.
  (–) = slotted head

SECTION 6
ELECTRICAL PARTS LIST

SEMICONDUCTORS

Transistors

Ref. No.	*Part No.*	*Description*
⇒Q1	8-727-312-00 Ⓒ	2SK 42-2
⇒Q2, 3	8-729-803-04 Ⓑ	2SC930
Q4	8-722-762-00 Ⓓ	3SK37
⇒Q5, 6	8-729-803-04 Ⓑ	2SC930
⇒Q7, 8	8-722-382-04 Ⓓ	2SK23A-824
⇒Q9–13	8-729-803-04 Ⓑ	2SC930
⇒Q14, 15	8-729-663-47 Ⓑ	2SC1364
⇒Q16, 17	8-769-010-35 Ⓑ	2SK107
⇒Q18	8-727-788-00 Ⓑ	2SA678
⇒Q19	8-729-663-47 Ⓑ	2SC1364
Q20	8-760-335-10 Ⓑ	2SC1474
⇒Q21	8-729-468-43 Ⓑ	2SA684
⇒Q22	8-729-663-47 Ⓑ	2SC1364
⇒Q23	8-727-788-00 Ⓑ	2SA678
⇒Q24	8-729-468-43 Ⓑ	2SA684
⇒Q25, 26	8-729-663-47 Ⓑ	2SC1364
⇒Q27	8-729-803-04 Ⓑ	2SC930
Q28	8-763-213-00 Ⓒ	2SA861
⇒Q29–31	8-729-663-47 Ⓑ	2SC1364
⇒Q32	8-727-312-00 Ⓒ	2SK42-2
⇒Q33, 34	8-729-671-13 Ⓑ	2SC710
⇒Q35	8-727-788-00 Ⓑ	2SA678
⇒Q36	8-729-803-04 Ⓑ	2SC930
⇒Q37	8-729-671-13 Ⓑ	2SC710
⇒Q38	8-727-788-00 Ⓑ	2SA678
⇒Q39	8-729-803-04 Ⓑ	2SC930
⇒Q40–47	8-729-663-47 Ⓑ	2SC1364

ICs

Ref. No.	*Part No.*	*Description*
IC1	8-751-620-00 Ⓕ	CX-162
IC2	8-759-270-60 Ⓒ	TA7060P
⇒IC3	8-759-902-93 Ⓕ	SN74LS293N
IC4	8-759-155-10 Ⓙ	μPB551C
IC5	8-759-902-90 Ⓕ	SN74LS290N
IC6	8-759-648-25 Ⓝ	M54825P

Diodes

Ref. No.	*Part No.*	*Description*
D1–8	8-719-815-55 Ⓐ	1S1555
⇒D9	8-729-803-04 Ⓑ	2SC930
D10, 11	8-719-815-55 Ⓐ	1S1555
D12, 13	8-719-026-11 Ⓐ	1T261
⇒D14	8-719-422-21 Ⓐ	1T22AM
D15–18	8-719-815-55 Ⓐ	1S1555
D19, 20	⚠8-719-200-02 Ⓑ	10E2
⇒D21	8-719-713-93 Ⓑ	1S2139C
D22	8-719-905-12 Ⓛ	SL1512
⇒D23	8-719-422-21 Ⓐ	1T22AM
VDR1	8-719-122-00 Ⓑ	VD1220

Thermistors

Ref. No.	*Part No.*	*Description*
Th1, 2	1-800-007-00 Ⓑ	S-300

COILS

Ref. No.	*Part No.*	*Description*
L1	1-401-456-00 Ⓑ	FM ANT
L2	1-420-859-00 Ⓐ	FM RF
L3	1-405-642-00 Ⓐ	FM Osc
L4	1-407-181-XX Ⓐ	IF TRAP
L5	1-401-715-00 Ⓔ	SW ANT
L6	1-401-716-00 Ⓔ	SW RF
L7	1-405-787-00 Ⓑ	MW Osc
L8	1-405-788-00 Ⓑ	SW1 Osc
L9	1-405-789-00 Ⓑ	SW2 Osc
L10	1-405-790-00 Ⓑ	SW3 Osc
L11	1-401-726-00 Ⓒ	MW Ferrite-rod Antenna
L13	1-407-188-XX Ⓐ	Microinductor, 6.8μH
L14	1-407-161-XX Ⓐ	Microinductor, 22μH
L15	1-407-187-XX Ⓐ	Microinductor, 5.6μH
L16	1-407-159-XX Ⓐ	Microinductor, 15μH
L17	1-407-187-XX Ⓐ	Microinductor, 5.6μH
L18	1-407-166-XX Ⓐ	Microinductor, 56μH
L19	1-407-158-XX Ⓐ	Microinductor, 12μH
L20	1-407-169-XX Ⓐ	Microinductor, 100μH
L21	1-407-856-00 Ⓒ	Choke
L22, 23	1-407-169-XX Ⓐ	Microinductor, 100μH

- ⇒: Due to standardization, interchangeable replacements may be substituted for parts specified in the diagrams.

- Circled letters (Ⓐ to Ⓩ) are applicable to European models only.

Note: The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

Note: Les composants identifiés par un tramé et une marque ⚠ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

ICF-6700W

629

FM/AM MULTI BAND RECEIVER

Canadian Model
US Model
AEP Model
UK Model
E Model

SUPPLEMENT

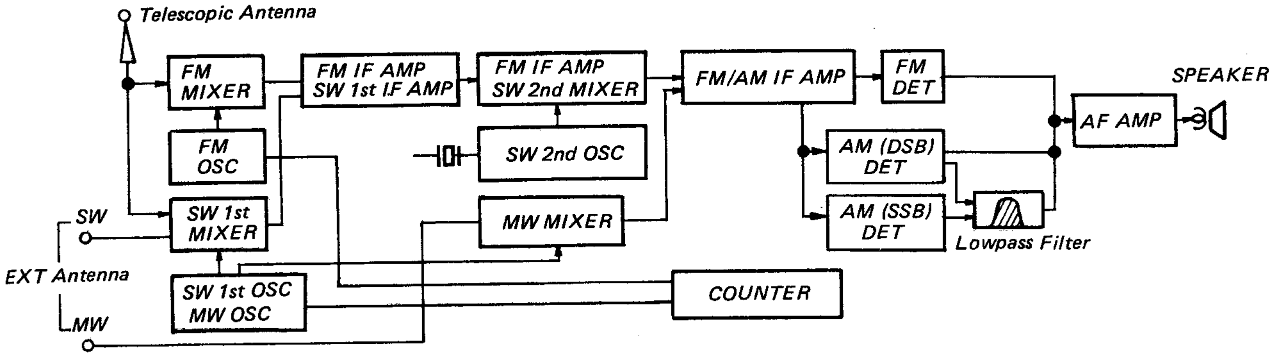
File this supplement with the service manual.

No. 1
December, 1978

I. RECEPTION CIRCUIT

Fig. 1 is a block diagram of the equipment. Only the main parts are indicated to clearly illustrate the operation of the system. The basic system is the same as that of Sony's other medium-priced sets, except for the digital display of the received frequency. Consequently, it is very different from others like the ICF-6800W with synthesizers. It consists of advanced circuits giving high efficiency. These include a double super heterodyne circuit with I-Fs at 10.7 MHz and 455 kHz, a balanced type first frequency mixer, a preselector with high gain over a wide frequency range, a low frequency filter to enable easy listening to SSB, an FET RF amplifier that withstands noise and even an FET RF stage in the MW band.

Below is a brief explanation of how these circuits process the received signals.



Telescopic Antenna
FM MIXER
FM OSC
FM IF AMP SW 1st I.F AMP
FM IF AMP SW 2nd MIXER
SW 2nd OSC
FM/AM IF AMP
FM DET
AM (DSB) DET
AM (SSB) DET
Lowpass Filter
AF AMP
SPEAKER
SW
EXT Antenna
MW
SW 1st MIXER
SW 1st OSC MW OSC
MW MIXER
COUNTER

Fig. 1

SONY®
SERVICE MANUAL

628

1. SW bandpass filter

A bandpass filter is installed in the SW external antenna terminal input circuit. This filter prevents large-amplitude signals of unwanted frequencies from getting into the high-frequency amplifier. The filter is not installed at the rod antenna, however, because the impedance of the rod antenna is high enough to reject undesired large-amplitude signals. In addition, the filter would be less effective because of the high and frequency-dependent impedance of the rod antenna.

2. Preselector

Preselectors are installed at both the input and output sides of RF amplifier Q4 and are synchronized. These are the same as the RF amplification circuits of regular type of receivers, but in order to maintain high efficiency over a wide range of frequencies and also to simplify the system, they are designed to be operated separately from the main dial. Moreover, L and C are set to be variable since a wide range of frequencies are to be covered.

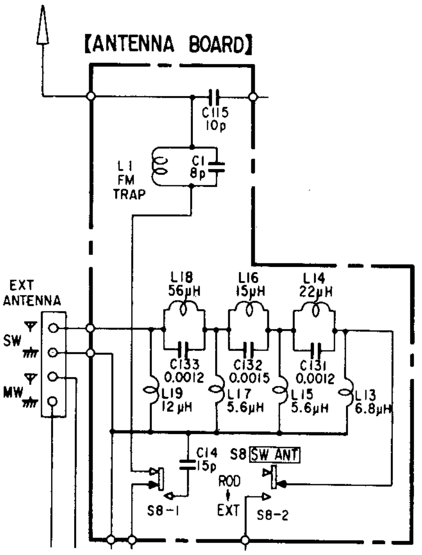

[ANTENNA BOARD]
C115 10p
L1 FM TRAP
C1 8p
EXT ANTENNA
SW
MW
L18 56μH
L16 15μH
L14 22μH
C133 0.0012
C132 0.0015
C131 0.0012
L19 12μH
L17 5.6μH
L15 5.6μH
L13 6.8μH
C14 15p
S8 SW ANT
ROD
EXT
S8-1
S8-2

Fig. 2

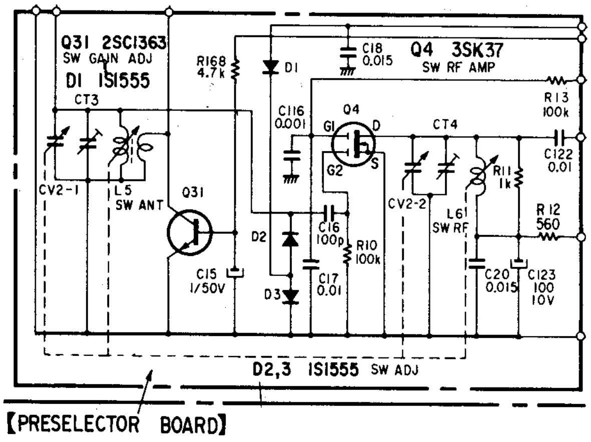

Q31 2SC1363 SW GAIN ADJ
D1 1S1555
CT3
R168 4.7k
D1
C18 0.015
Q4 3SK37 SW RF AMP
R13 100k
C116 0.001
Q4
G1
D
G2
S
CT4
C122 0.01
CV2-1
L5 SW ANT
Q31
CV2-2
L6 SW RF
R11 1k
R12 560
D2
C16 100p
R10 100k
C15 1/50V
D3
C17 0.01
C20 0.015
C123 100 10V
D2,3 1S1555 SW ADJ
[PRESELECTOR BOARD]

Fig. 3

3. High frequency gain adjustment See Fig. 3 and 4.

RV1 controls the impedances of Q31, D2 and D3 which are also the input impedance of RF amplifier Q4. It also controls impedances D4, D6 of the antenna circuit in the MW band and results in varying the RF gain in the MW band as well. When RV1 is at the maximum gain position, AGC voltage is applied to D2, D3, D4 and D6.

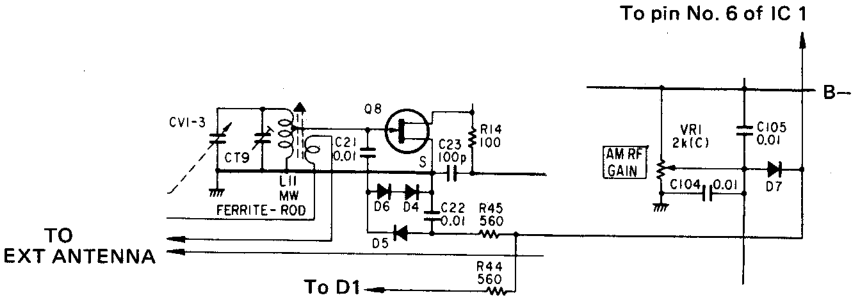

To pin No. 6 of IC 1
B−
CV1-3
CT9
L11 MW FERRITE-ROD
Q8
C21 0.01
C23 100p
S
R14 100
D6
D4
C22 0.01
R45 560
D5
TO EXT ANTENNA
R44 560
To D1
AM RF GAIN
VR1 2k(C)
C105 0.01
C104 0.01
D7

Fig. 4

4. SW primary frequency mixer (Q16, 17)

This balanced type frequency mixer consists of two 2SK23As. A characteristic of this type of frequency mixer is that signals entering from the balanced side are not, as a rule, transmitted to the output side. The received signal amplified by Q4 enters the balanced side. Applying the received signal to the balanced side makes it low in noise even when spurious waves of different frequencies are brought into the frequency mixer. This becomes quite effective for spurious waves which are the same as the first I-F 10.7 MHz. A variable resistor is installed in the source circuit so that the gains of Q16 and Q17 are simulaneously adjusted for the best balance. Local oscillation output is transmitted to the source. This frequency mixer transfers the received frequency to 10.7 MHz to enter the FM 1-F amplifier. Setting the first I-F at 10.7 MHz means that the circuit can be used for FM and, since the frequency is high, an outstanding image rejection rate is obtained.

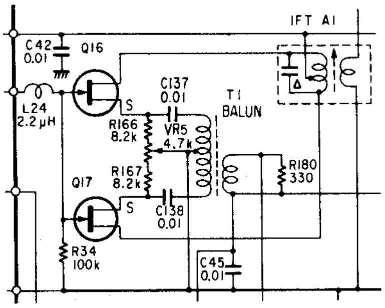

IFT A1
C42 0.01
Q16
L24 2.2μH
S
C137 0.01
T1 BALUN
R166 8.2k
VR5 4.7k
R167 8.2k
Q17
S
C138 0.01
R180 330
R34 100k
C45 0.01

Fig. 5

5. SW second frequency mixer (Q10)

This frequency mixer also operates as an FM I-F amplifier. For SW, by changing the bias it can be used as a second frequency mixer. This also transfers 10.7 MHz to the second I-F of 455 kHz. A local oscillator signal of high stability from a crystal oscillator is put into the emitter. The frequency of the local oscillator is fixed at 10.245 MHz. The output of the second frequency mixer enters IC1 by way of CFT and CFU to be amplified.

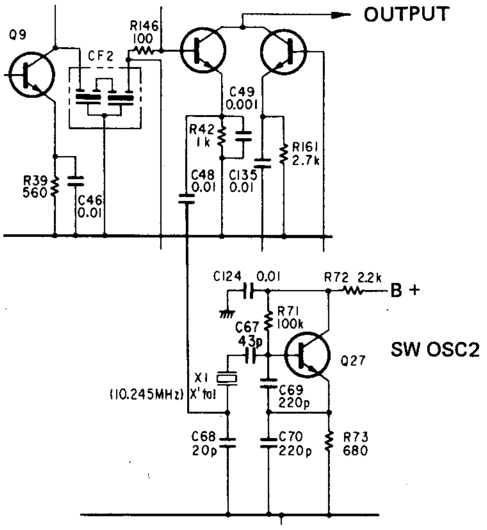

OUTPUT
Q9
R146 100
CF2
C49 0.001
R42 1k
R161 2.7k
R39 560
C46 0.01
C48 0.01
C135 0.01
C124 0.01
R72 2.2k
B +
R71 100k
C67 43p
Q27
SW OSC2
X1 X'tal
(10.245MHz)
C69 220p
C68 20p
C70 220p
R73 680

Fig. 6

6. SW second 1-F amplifier (IC1)

This IC contains not only an AM I-F amplifier but also an FM I-F amplifier, an AGC circuit, a meter circuit, etc.

7. Wave detector (D14–D16)

D14 and D15, D16 are wave detector diodes for DSB and SSB respectively. The detector for SSB is an ordinary balanced product detector. LSB and USB are selected by using S2-2 and C134 to shift the frequency by 2 kHz. This is performed by adjusting the core of L12 so that reproduced frequencies of LSB and USB become identical after receiving non-modulated waves accurately at the DSB position. The wave detector for DSB is a conventional type.

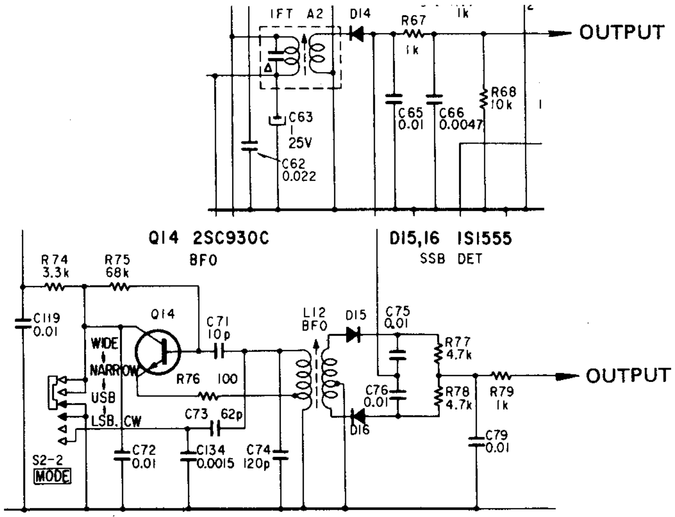

IFT A2
D14
R67 1k
OUTPUT
C63 1 25V
C62 0.022
C65 0.01
C66 0.0047
R68 10k
Q14 2SC930C BFO
D15,16 1S1555 SSB DET
R74 3.3k
R75 68k
C119 0.01
Q14
C71 10p
L12 BFO
D15
C75 0.01
R77 4.7k
WIDE
NARROW
USB
LSB. CW
R76 100
C73 62p
C76 0.01
R78 4.7k
R79 1k
OUTPUT
D16
C72 0.01
C134 0.0015
C74 120p
C79 0.01
S2-2 MODE

Fig. 7

8. Low-frequency filter (Q15, Q46, Q47)

It is more important for SSB receivers to reproduce sound easy to understand, rather than high fidelity sound, for this reason after the signal is detected it is passed through the bandpass filter to cut off unwanted frequencies and noise. The dedector output in SSB operation is usually lower than that of DSB, and thus the filter produces some gain. Even for DSB, this filter cuts off the high and low range of frequencies so that the sound is easy to understand. This filter has a peak at approximately 1 kHz and is approximately −20 dB at 150 Hz and 2 kHz. After this filter, the signal is amplified by the AF amplifier and is sent to the speakers.

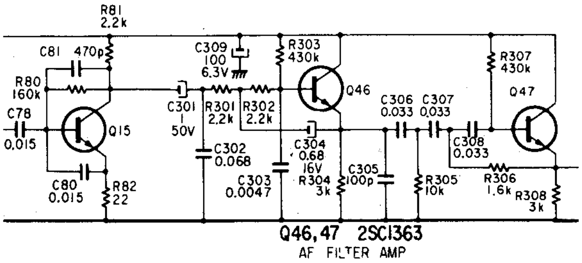

R81
2.2k
C81 470p
R80
160k
C78
0.015
Q15
C80
0.015
R82
22
C309
100
6.3V
C301
1
50V
R301
2.2k
R302
2.2k
C302
0.068
C303
0.0047
R303
430k
Q46
C304
0.68
16V
R304
3k
C305
100p
C306
0.033
C307
0.033
C308
0.033
R305
10k
R306
1.6k
R307
430k
Q47
R308
3k
Q46,47 2SC1363
AF FILTER AMP

Fig. 8

II. DISPLAY CIRCUIT OF RECEIVED FREQUENCY

The block diagram of the display circuit is shown in Fig. 9.

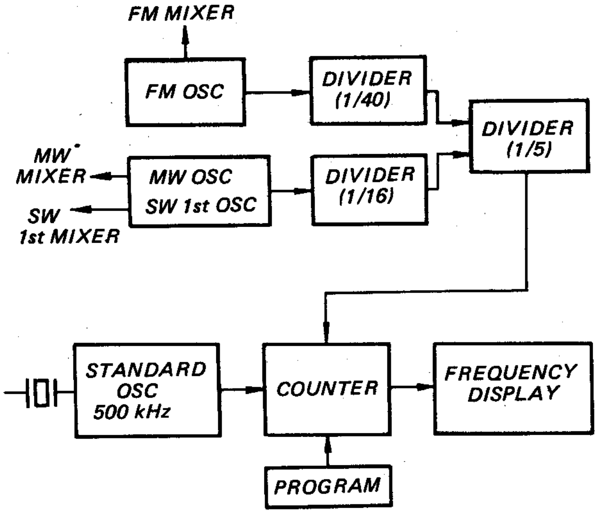

FM MIXER
FM OSC
DIVIDER (1/40)
DIVIDER (1/5)
MW MIXER
MW OSC
SW 1st OSC
SW 1st MIXER
DIVIDER (1/16)
STANDARD OSC 500 kHz
COUNTER
FREQUENCY DISPLAY
PROGRAM

Fig. 9

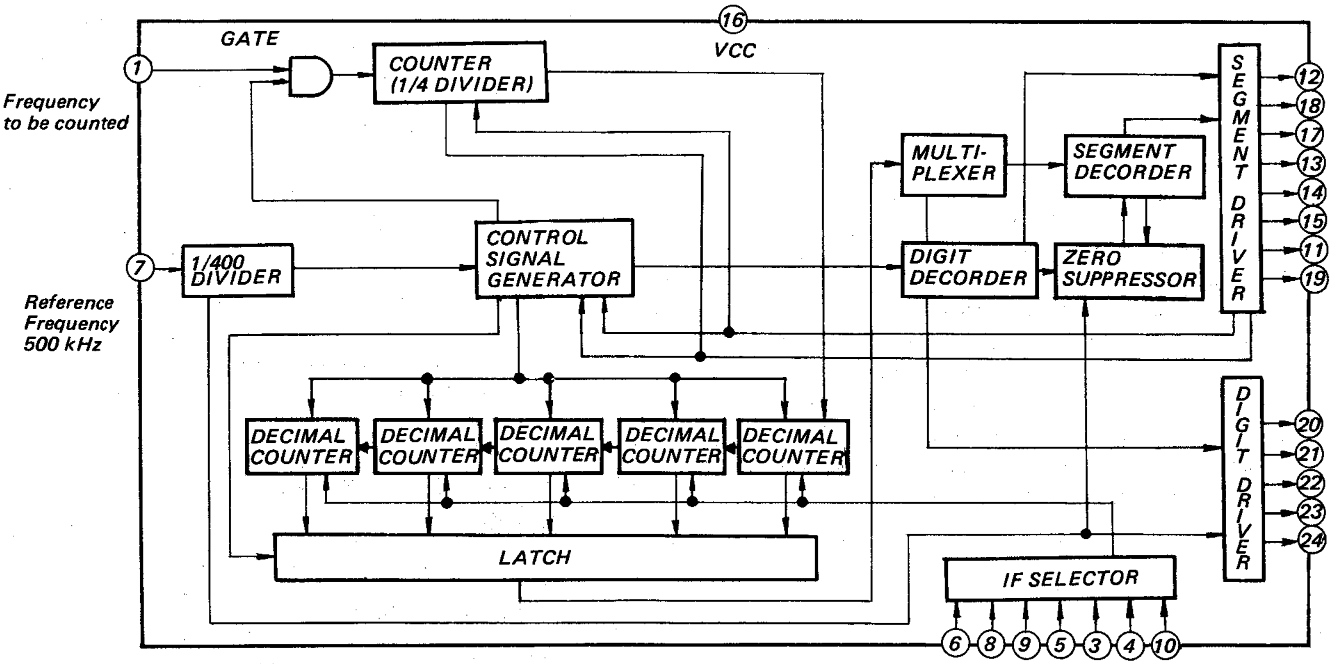

GATE
Frequency to be counted
1
COUNTER (1/4 DIVIDER)
16
VCC
MULTI-PLEXER
SEGMENT DECORDER
SEGMENT DRIVER
12
18
17
13
14
15
11
19
Reference Frequency 500 kHz
7
1/400 DIVIDER
CONTROL SIGNAL GENERATOR
DIGIT DECORDER
ZERO SUPPRESSOR
DECIMAL COUNTER
DECIMAL COUNTER
DECIMAL COUNTER
DECIMAL COUNTER
DECIMAL COUNTER
DIGIT DRIVER
20
21
22
23
24
LATCH
IF SELECTOR
6
8
9
5
3
4
10

Fig. 10 BLOCK DIAGRAM OF IC 6

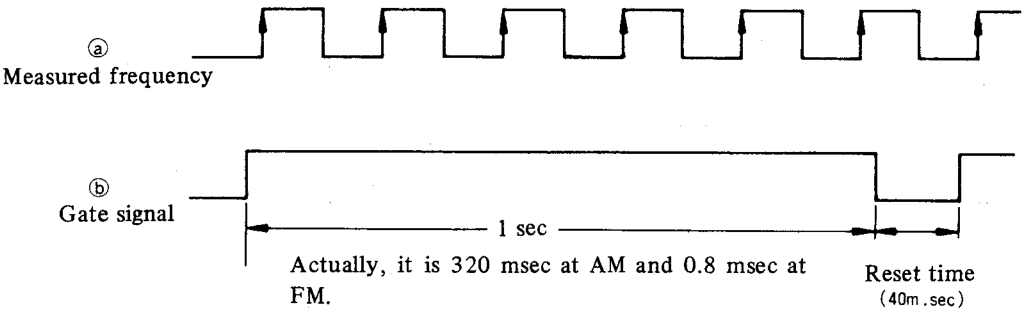


Fig. 11

Basic Operation of IC6 Counter

When a signal whose frequency is to be measured is applied to terminal 1, this signal enters the gate circuit. A reference frequency of 500 kHz is generated at terminal 7, and this signal is applied to the control-signal generator through the divider.

This signal is divided further in the control-signal generator so that a pulse lasts for a second as shown in Fig. 11. Actually, a display down to 1 kHz in AM and 100 kHz in FM is sufficient. Thus, pulses in AM and in FM are set to be 320 msec and 0.8 msec respectively. This signal from the control-signal generator. is applied to the gate circuit (this signal is referred to as the gate signal). The gate circuit acts as an AND circuit, and an output signal appears when both ⓐ and ⓑ are at the same level. This output signal is divided and counted by the decimal counter.

As shwon in Fig. 11, 6 pulses counted for a duration of 1 second make up the frequency 6 Hz.

Actually, high frequencies on the order of 10 MHz are received. Since the gate signal lasts for a second, the decimal counter must count pulses on the order of 10^5. Therefore, an extremely high speed counter is essential. The gate signal and the frequency to be measured are divided at the same proportion and counted. This method is called "Prescaling".

Decimal Counter

The signal generated above is applied to the decimal counter and its frequency is counted. The decimal counter returns to 0 after counting from 0 to 9, and 1 is displayed at the next counter.

Explanation of the operation of the decimal counter will be given using an example of a decimal counter in the Master-Slave system (negative-going trigger).

In this method as shown in Fig.12, the counter reads in the signal while the input signal is at a higher level, as indicated by the heavy line, and generates signals according to the truth table in Fig.13 when the input signal changes from the higher to the lower level as indicated by the arrow.

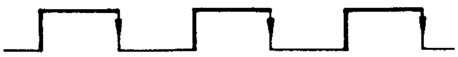


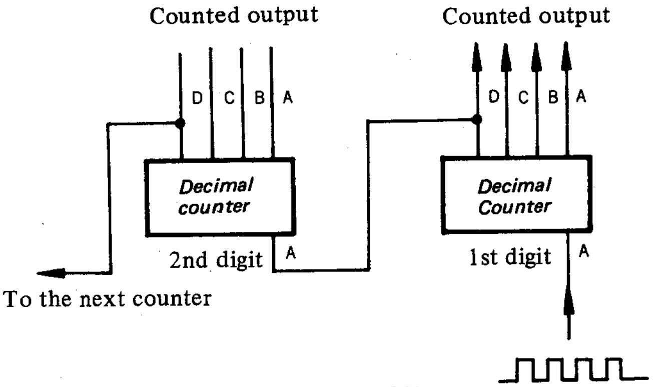
Fig. 12

Truth Table

Count	D	C	B	A
0	0	0	0	0
1	0	0	0	1
2	0	0	1	0
3	0	0	1	1
4	0	1	0	0
5	0	1	0	1
6	0	1	1	0
7	0	1	1	1
8	1	0	0	0
9	1	0	0	1

Return from 9 to 0.

Fig. 13


Counted output
Counted output
D
C
B
A
D
C
B
A
Decimal counter
Decimal Counter
2nd digit
A
1st digit
A
To the next counter
Frequency to be counted

COUNTER CONNECTION
Fig. 14

The frequency to be measured is applied to input A. Output D is connected input A of the next counter, and the next counter displays 1 when the count changes from 9 to 10.

Output D becomes 1 at 8 in the table, but the next counter does not display 1. The reason for this is that the signal to input A of the next counter is at a high level for both 8 and 9 and only goes low when the signal changes to a low level after 9.

The frequency is measured by using this technique.

The signals (outputs from A, B, C, D mentioned above) from the decimal counters are simultaneously sent to the latch circuit.

When the gate signal goes off, the decimal counter is reset to 0 for the next counter.

Latch Circuit

The result of the decimal count is put in the memory of the latch circuit when the gate signal is terminated. The purpose of the latch circuit is to keep certain information for a certain period of time.

In general, the latch circuit is made up of D type flip-flops.

Without the latch circuit, the display of the counter changes constantly as the counter counts pulses while the gate is open. The display becomes fixed and readable only when the gate is closed. The display returns to 0 when a reset signal is received and starts counting as the gate opens. This operation is repeated.

Therefore, with the latch circuit the display is fixed when the counting is over and continues to be so even when the reset signal is received. The display changes to show the results of the next count only when the next count is finished.

Multiplexer

The signal from the latch circuit is then sent to the multiplexer. This IC controls the LED display unit by a method called "dynamic drive", the generation of pulses to illuminate the digits of the LED in order from the 1st to the 5th digit.

Each digit of the LED is lit in sequence at a fast rate, but appears to the human eye to be lit continuously due to the "persistence of vision" effect.

This operation is performed through the multi-

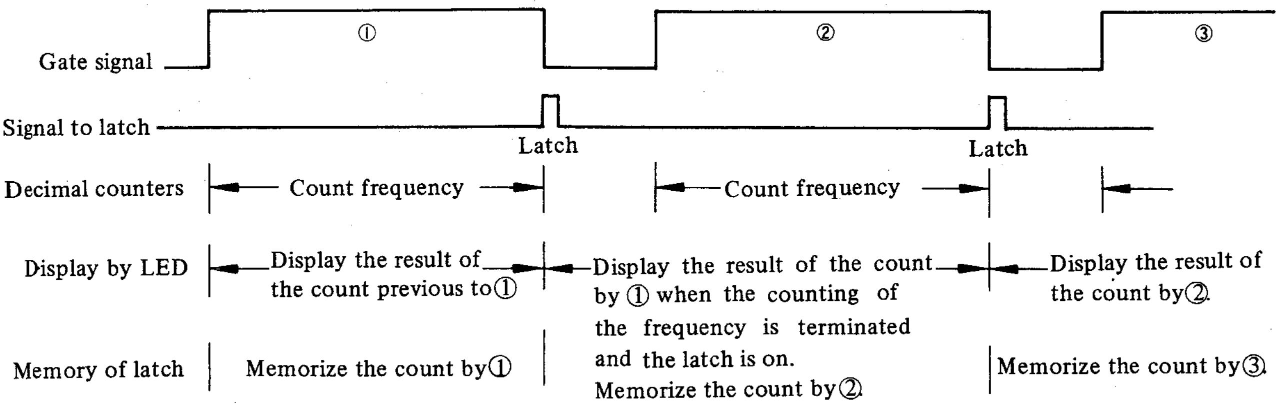
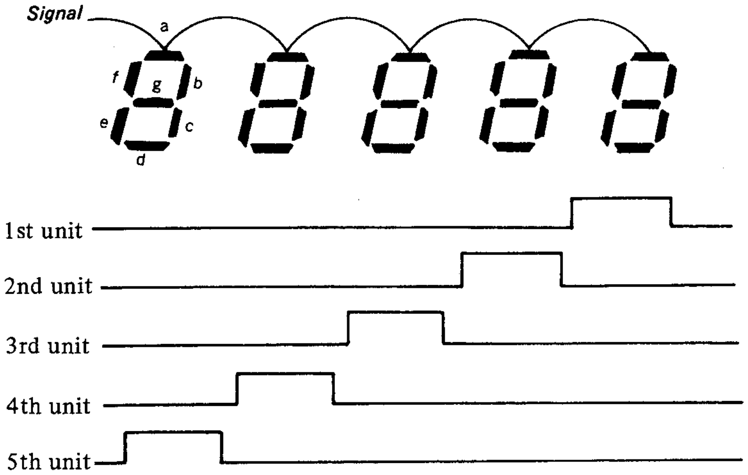

Gate signal
①
②
③
Signal to latch
Latch
Latch
Decimal counters
Count frequency
Count frequency
Display by LED
Display the result of the count previous to①
Display the result of the count by ① when the counting of the frequency is terminated and the latch is on.
Display the result of the count by②
Memory of latch
Memorize the count by①
Memorize the count by②
Memorize the count by③

Fig. 15



The same segment in each unit is connected in parallel.

Apply a pulse so that each unit lights up in sequence.

Fig. 16

Segment Decoder

The purpose of the segment decoder is to change the output signals of the decimal counter to signals that illuminate the corresponding segment (a–g) of the LED.

The segment decoder operates as shown below. When the figure "2" is desplayed, for example, the signals shown in Fig. 8 are sent as output signals from the segment decoder.

Display of figure "2"

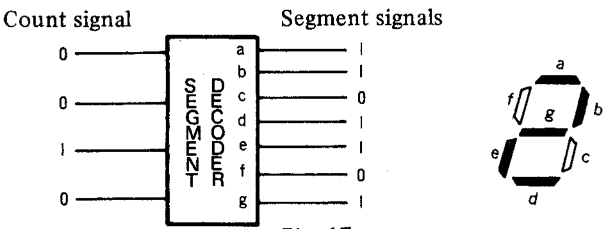


Fig. 17

Conversion Table

Figure	Count signal	Segment signal						
		a	b	c	d	e	f	g
0	0 0 0 0	1	1	1	1	1	1	0
1	0 0 0 1	0	1	1	0	0	0	0
2	0 0 1 0	1	1	0	1	1	0	1
3	0 0 1 1	1	1	1	1	0	0	1
4	0 1 0 0	0	1	1	0	0	1	1
5	0 1 0 1	1	0	1	1	0	1	1
6	0 1 1 0	1	0	1	1	1	1	1
7	0 1 1 1	1	1	1	0	0	1	0
8	1 0 0 0	1	1	1	1	1	1	1
9	1 0 0 1	1	1	1	1	0	1	1

Segment Driver

This amplifies signals generated by the segment decoder to the level required to operate the LED segments.

Digit Decoder

This generates signals for the multiplexer and the digit driver simultaneously.

Digit Driver

As previously mentioned in the explanation of the multiplexer, this IC provides the "dynamic drive" for the LED display.

This illuminates the 1st to the 5th digits in order. Q41–45 control the on-off operations of each digit of the LED. On-off signals are sent to Q41–45 by the digit driver.

Zero Suppress

Zero suppress is the circuit which terminates the display of zeroes preceding the significant figure.

Example: 00100 kHz
└These 00 figures are not displayed.

Dynamic chart of each signal

An output dynamic chart for 12345 is given below as an example.

When both digit and segment outputs are at High level, the output is on.

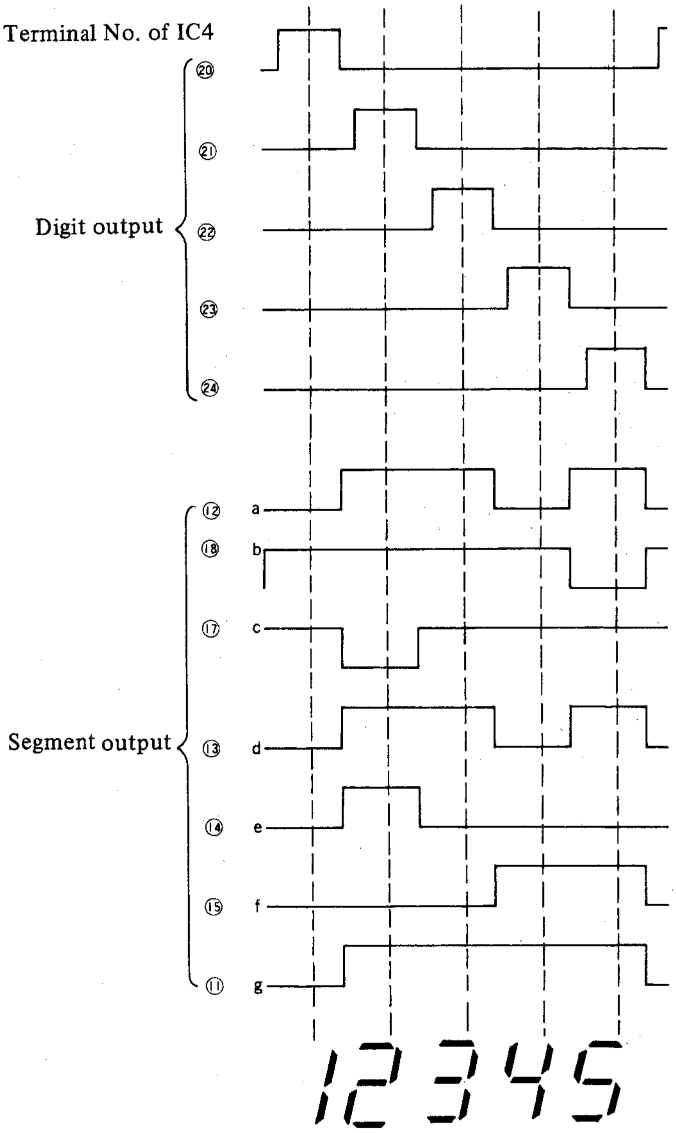


Fig. 18

I-F Selector

Since the frequency of the first local oscillator is 20.7 MHz, the counter would indicate 20.7 MHz if counted as it is, even if one wishes to display 10 MHz when receiving SW.

In order to get a display of 10 MHz a certain frequency must first be subtracted from the local-oscillator frequency. The I-F selector performs this subtraction. The counter has a display of five digits. If 0000 is set to be displayed when 10.700 is applied, 00001 kHz is displayed when 10.701 MHz is measured.

In order to get this performance, 10700 should be subtracted from the decimal counter before the next count.

These figures are calculated as follows.

100000 – 10700 = 89200
6 units

The figures 89200 should be set in the counter before counting a given frequency.

When 10.700 is counted, the display of the counters becomes 0, since 10700 + 89200 = 100000.

1 in the sixth digit is not displayed, since only 5 figures are displayed.

The I-F selector selects the figures to set in the counter before counting. The following figures are set by the I-F selector in this system.

FM	89200	
MW	99545	
SW	89200	(WIDE, NARROW)
	89198	(USB)
	89202	(LSB)

For SSB receivers, the received frequency is set at the carrier position. However, the oscillation frequency of transmitter is 2 kHz above or below the carrier frequency, and thus the I-F selector adds or subtracts 2 kHz before counting.

Timing chart of each signal

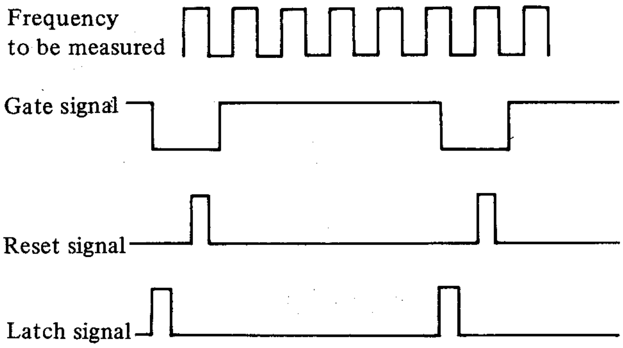


Fig. 19

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